FEBRUARY 1959

With Technical Feature Section

THE JOURNAL
of the American Society of
Safety Engineers

National SAFETY NEWS

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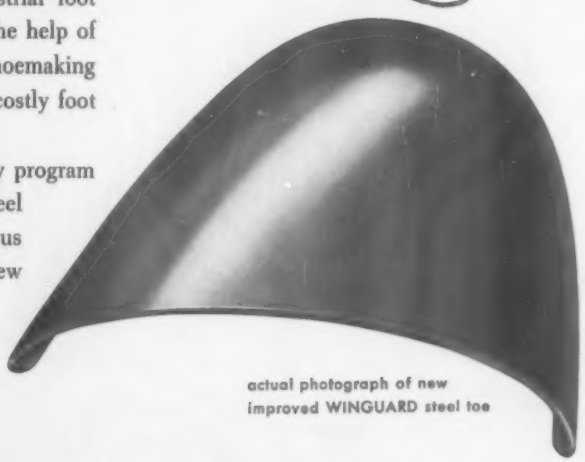

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A NATIONAL SAFETY COUNCIL PUBLICATION

Vol. 79, No. 2 FEBRUARY 1959

EDITORIAL

4 This Priceless Human Quality

FEATURE ARTICLES

8 We'd Like to Do More—*General George C. Stewart*
18 TV Eyes Watch Atom at Work
20 Ultrasonic Detectives—*Peter K. Bloch*
22 Where Would We Be Without Safety Equipment?—*W. J. M. Redwood*
25 Budget—*Robert D. Gidel*
26 Labor and Management Point with Pride—*B. F. Hyde*
28 Machining Beryllium—*J. W. Kent*
30 Morning at the Desk (Diary of a Safety Engineer)—*Bill Andrews*
31 Howard Pyle New President of National Safety Council
32 Industrial Hygiene Instruments—*Warren A. Cook, Ph.D.*
36 New Goals in Occupational Safety—*Richard D. Lutz*
37 Gravity Drop Hammers—*Data Sheet D-473*
60 George Burns Retires from Council Staff

PLANT MAINTENANCE AND SANITATION

24 Where Does Sanitation Belong?—*J. Lloyd Barron*

DEPARTMENTS

12 Accident Barometer
14 Safety Valve
17 News Briefs
34 Ideas that Worked
42 Wire from Washington
58 Safety Library
85 Small Business and Associations
88 Around the Compass
94 Coming Events
96 Calendar Contest
97 What's New
98 Safety Posters
119 New Products
128 Trade Publications

SPECIAL TECHNICAL SECTION

The JOURNAL of the American Society of Safety Engineers—*Robert E. Beighley, Editor*.....65-84

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THE COVER

Slave robot displayed by Argonne National Laboratory at Second International Conference on Peaceful Uses of Atomic Energy held in Geneva, September 1958. The slave robot is designed for repair and handling operations involving highly radioactive materials behind heavy shielding. At left are control units. At right, the slave mechanism. Closed circuit television cameras at right provide operator with three-dimensional view of what slave robot is doing. Television viewer is placed above operator, between arms of control mechanism.

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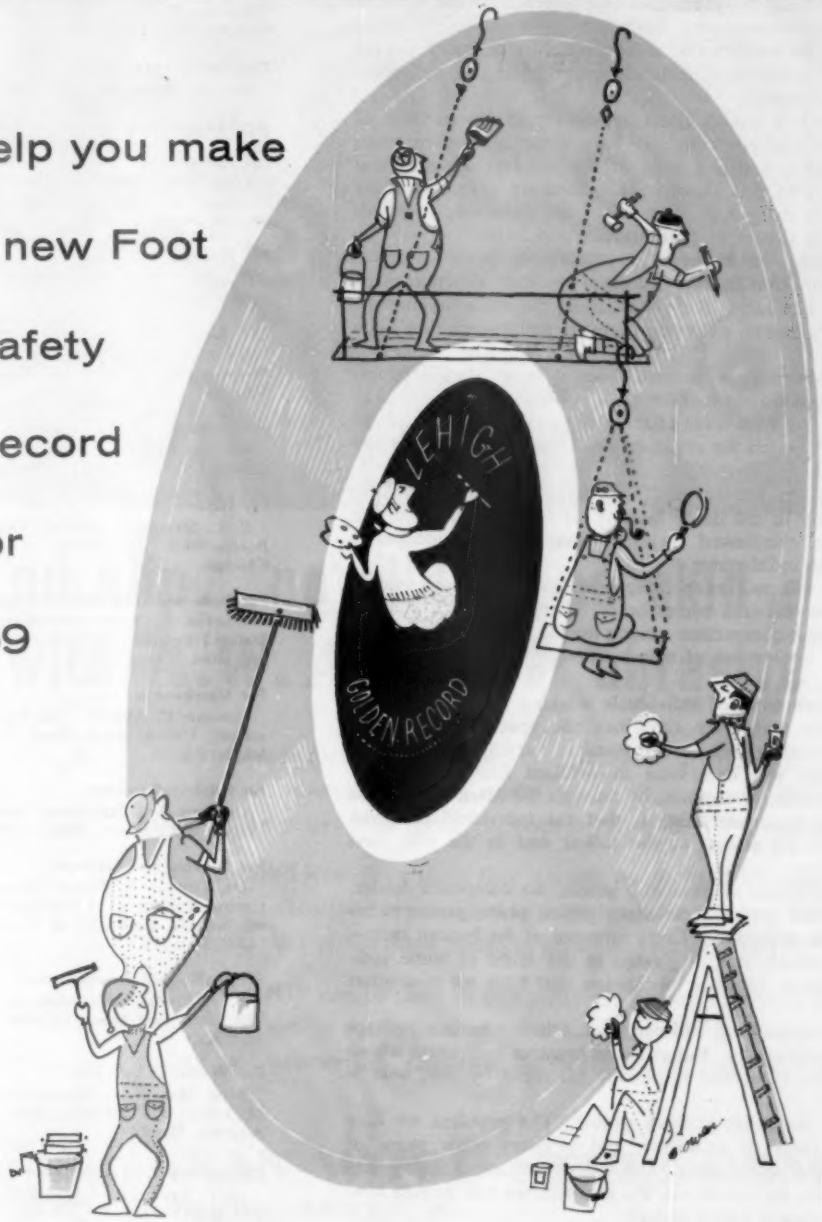

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EDITORIAL

This Priceless Human Quality

ALL ORGANIZATIONS recruit their people from the same melting pot—the same source which supplies the human raw material for all trades and vocations. They represent a cross section of society—the brilliant and the dull, the good and the bad. Grouped together, the weakness in one is compensated by strength in another. The exuberance of the young is tempered with the steadiness and wisdom of the mature.

Under proper circumstances, the group can add leverage to the work of an individual beyond his own strength. Team play is vital.

Today, we hear much of conformity. Whenever two or more people come in contact, peaceful coexistence demands some yielding of individual taste, preference, and personality.

Conformity in behavior is a human necessity; conformity in patterns of thought a human danger. Unfortunately, we have come in modern times to confuse the two. There is a strong body of opinion that assumes that the conformist is the boy who gets ahead. Schoolboys are graded on their ability to "cooperate" with the group. New ideas are disturbing to minds that prefer the meandering stream of past practice and habit.

In our large organizations—in business, government or labor—progress will be made in direct proportion to the intellectual freedom of action given to the men on the team. The larger the organization, the more assiduously it must work to keep its channels of encouragement and recognition open and flowing.

Thorough training is obviously a necessity, but it must always be remembered that organizations do not make men; it is men who make organizations. It is what they bring with them in the way of character and adaptability and fresh ideas that enrich the organizational bloodstream and insure corporate longevity.

Not only the organization but society itself suffers when people are allowed to sacrifice identity in the damp laundry of mediocrity. Men can be obscured, frustrated, or overlooked. Injustices may be done, indignities suffered, promise turned to indifference.

Competent leadership will minimize these instances, although, people being people, perfection in this area comes hard. There are, unfortunately, few valid standards of direct comparison among human beings. We cannot catalog the strengths and weaknesses of men as though they were so much blooded dairy stock.

The functions and opportunities of individuals working within an organization will obviously differ with their capacities and special competence. Contributions to the joint effort will be expressed in varying ways and in varying proportion. Some will contribute in brilliant flashes of form; others through their steadiness, persistence, or through the often overlooked grind of hard work. The important thing is that the individual be given the opportunity to exploit his talents to the fullest and in the way best suited to his personality.

Try as we will, we can create no synthetic genius, no composite leader. Men are not interchangeable parts like so many pinion gears; genius is bestowed by nature upon the individual. Every advance of the human race—scientific, cultural, or spiritual—has originated in the mind of some individual with qualities of mind, spirit, or dedication that have set him apart from his fellows.

Others there are who can pick up and carry on, others who can perhaps go far beyond normal expectations. But it is the creative individual whose dreams awaken him in the night and preoccupy his mind by day, who is the indispensable man.

By dreams, of course, we mean creative genius. The problem we face today, in science, in business, in education, and in every other phase of human activity is to develop and preserve within our institutions, this priceless human quality. Unless we can do so, the problem we will bequeath to our successors will be a dismal legacy indeed.

—Crawford H. Greenewalt, President, E. I. du Pont de Nemours & Co. (From McKinsey Foundation Lecture No. 1, given at Columbia University, April 8, 1958)

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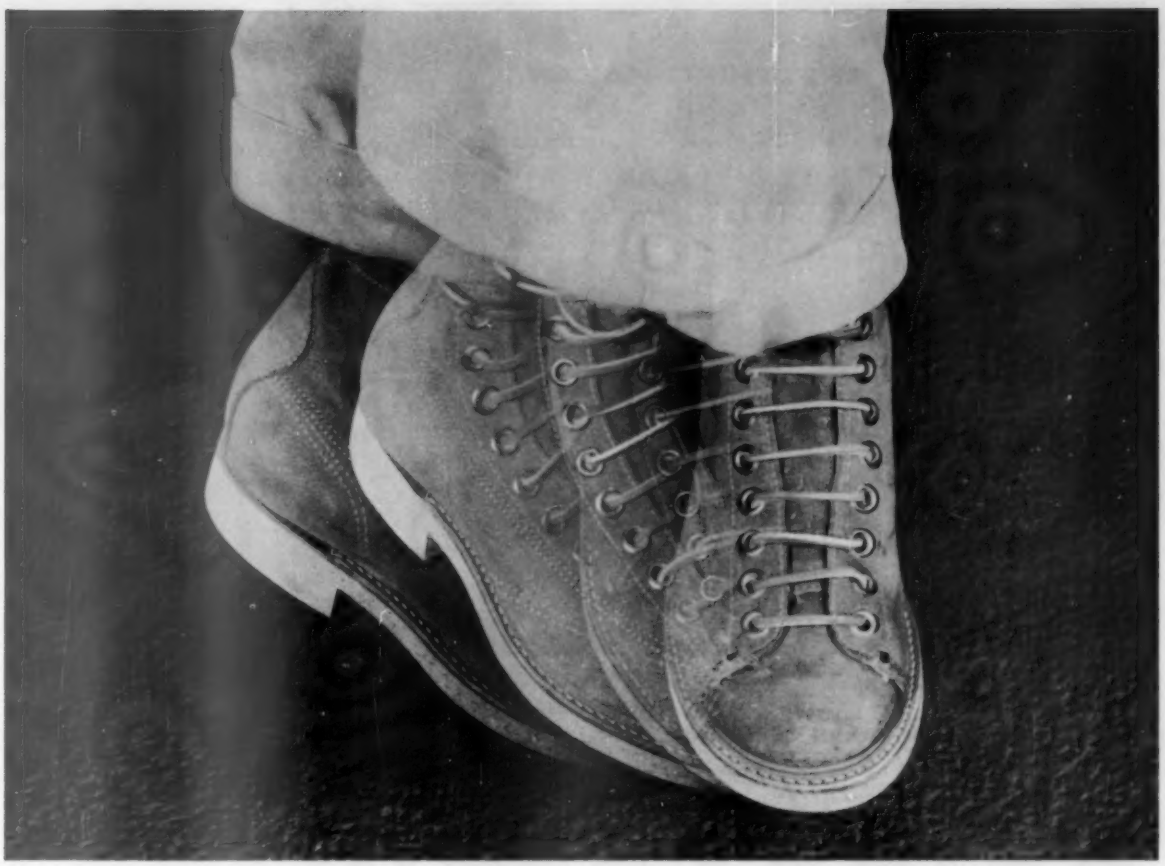

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Keefer Honored By ASSE

In recognition of his 43 years of service to safety, W. Dean Keefer was presented with a certificate of life membership in the American Society of Safety Engineers. The presentation was made at a meeting of the Chicago Chapter on December 15.

In the above illustration, Mr. Keefer (right) is receiving the certificate of honorary life membership from Joseph C. Stennett, manager of the Accident and Fire Prevention Department of the National Association of Mutual Casualty Companies.

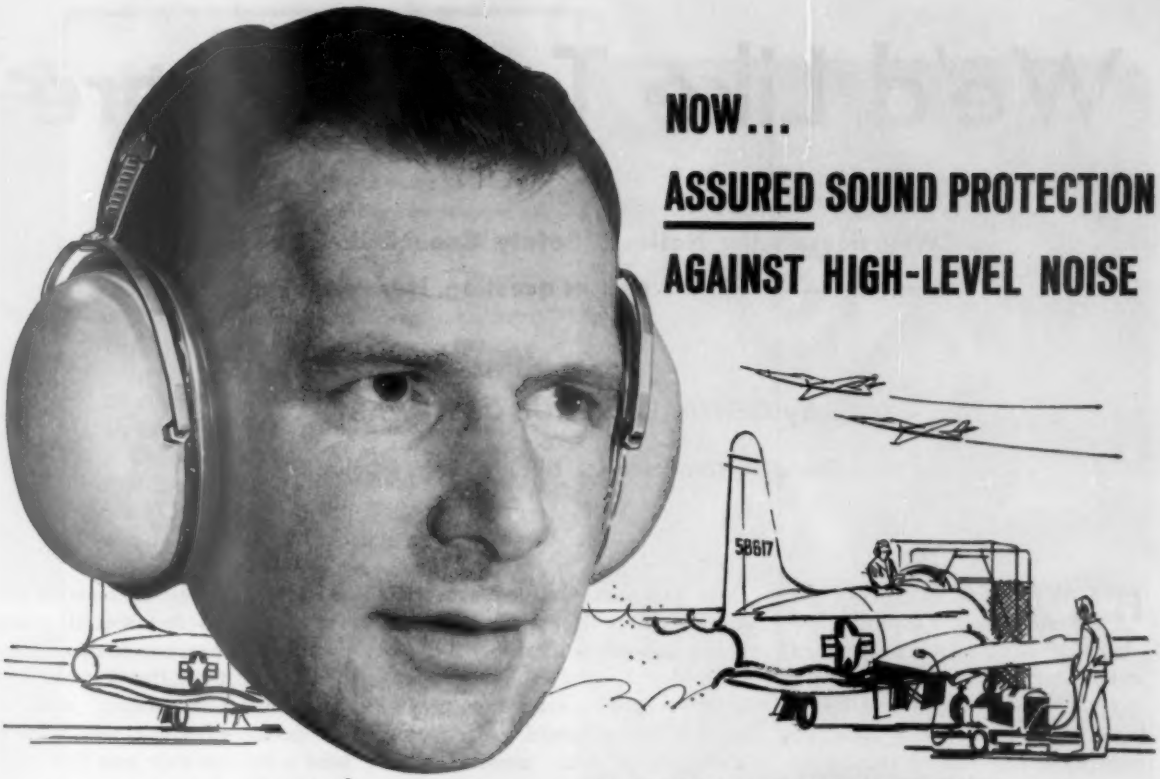
Born in Williamsport, Pa., Mr. Keefer was graduated from Syracuse University in 1915 with the degree of electrical engineer. The same year he became safety engineer with Aetna Life Insurance Company. In 1918 he became safety director for Four Wheel Drive Auto Company at Clintonville, Wis.

In 1919 he joined the National Safety Council headquarters staff as safety engineer and later became business manager. He was subsequently appointed chief engineer and manager of the Industrial Department.

On January 1, 1940 he became vice-president and chief engineer of Lumbermen's Mutual Casualty Company and its affiliated companies, a position he held until his partial retirement in July 1958.

Mr. Keefer's association with American Society of Safety En-

—To page 10



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We'd Like To Do More

"Why doesn't the National Safety Council do something about — — —?" is a frequent question. Here's the answer

By GENERAL GEORGE C. STEWART

Executive Vice-President, National Safety Council

BECAUSE I find so many of our members and supporters assume that the Council has the means to be everything to everyone in the safety field, I want to highlight a basic situation that has great influence on what we can and cannot do at any given time. This situation, stated in broad terms, is as follows:

The Council is charged by its charter to work for accident prevention in every area in which the people of this country are exposed to accidental death, injury, or economic loss.

To carry on accident prevention work requires money to pay the cost of activities and programs.

The Council derives its income from three sources:

1. Dues and sales of materials
2. Funds raised by the Trustees
3. Grants for specific programs

Revenue from dues and sales constitutes approximately 82 per cent of all income. By far the greater proportion of this type of income is derived from our industrial and business (occupational) members. Dues and sales for these types of members more than pay for the cost of our services to them.

Funds raised by the Trustees are used for public service programs such as home, school and college, traffic, and other non-industrial safety areas. In every year since I have been with the Council these funds have always been very close to the figure predicted by the Trustees. They have special value in that, except for the cost of the Office of Fund Solicitation, they do not involve the usual expense associated with dues and sales income. I know that I speak for all associated with the Council in expressing appreciation for the selfless work of the Trustees in providing the means to carry on work that would otherwise be impossible.

We are greatly indebted, also, to the industrial groups and others who have made substantial funds available for special programs. These funds have made it possible to do important work which would otherwise have been out of the question.

Funds granted for these specific programs, of course, can be used only for the purposes for which they were given. Except for the Farm Safety Program and the Small Business Program, these special grants are for activities in the public service area, and so supplement the Trustees funds.

However, the combination of Trustees funds and special grants do not cover expenses in those areas of Council work that are not self supporting. Consequently, some of the income from dues and sales is used to balance their cost. Our business and industrial members have always been aware of this and have been most understanding in their attitude.

However, in using income from one or two segments of our membership groups, there is a point beyond which it is neither moral nor practicable to go. This situation becomes particularly acute in periods of decreasing income such as we have been experiencing.

The distressing fact in this situation is that the need for accident prevention work is most impelling in areas that cannot be, and are not self-supporting.

All of this adds up to the conclusion that if we are to render a proper service to those members who provide the bulk of our income, through dues and sales, and at the same time meet our obligations to work effectively in those areas where accidents are causing the greatest damage, there must be a substantial increase in funds for the public service area.

I hope that these remarks will serve to explain why the Council cannot do all the things that the size of the accident problem obligates us to do.

At a meeting of the Council's Board of Directors held October 21, 1958, Executive Vice-President George C. Stewart analyzed the problems of the Council with respect to the financing of non-industrial safety programs. It was voted by the Board that General Stewart's remarks, reproduced here, be accepted as Board policy.

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—*From page 6*

gineers dates back to 1924. He was one of the Society's organizers and became its first secretary and newsletter editor. During World War II he served as president for two years.

While with the National Safety Council he originated the NSC *Safe Practices Pamphlets* which have been a reference source on industrial safety for a generation. He was the author of the original set of 12 pamphlets on *Safety in Foremanship*. He is co-author of *Industrial Safety*, published by Prentiss-Hall, and of many periodical articles. He organized the Regional Industrial Safety Conferences which resulted in the organization of many local safety organizations. He has been active in American Standards Association's safety standards program from the beginning and has served on numerous committees and research projects. He also served on various advisory committees of the U. S. Department of Labor, the President's Conference on Occupational Safety, and numerous others.

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THE ACCIDENT BAROMETER

Prepared by the Statistics Division, National Safety Council

ACCIDENTAL deaths in October totalled 7,700, or 3 per cent below 1957. Fewer deaths resulted from home and work accidents, more deaths from motor-vehicle accidents, and about the same number from public non-motor-vehicle accidents.

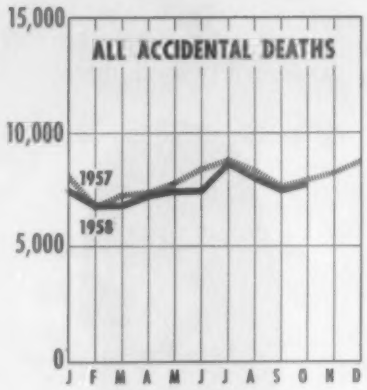
The 10-month total was 74,300, or 5 per cent down from 78,100 in 1957. Each class showed a reduction from 1957, with the greatest improvement recorded in motor-vehicle deaths.

Motor-Vehicle Deaths

There were about 3,590 deaths from motor-vehicle accidents in October, or 4 per cent above 1957. This was the first time in 14 months that an increase was recorded.

Deaths during the 10 months totalled 29,770—a reduction of 5 per cent from 1957. The 10-month death rate per 100,000,000 vehicle-miles is not available at this time, but the 9-month rate was 5.3, a decrease of 7 per cent from 1957.

For the 10-month period, 30 states had fewer deaths than last year, and 18 states had more deaths. States with the greatest improvement for the first 10 months of the year were: Vermont, –25 per cent; South Carolina, –22 per cent; West Virginia, –22 per cent.



	1958	1957	Change
October	7,700	7,900	—3%
10 Months	74,300	78,100	—5%

Reporting cities with populations of more than 10,000 showed an increase of 2 per cent for October, but a decrease of 4 per cent for the 10-month period. Cities with more than 200,000 population having the largest reduction in deaths for 10 months were: Long Beach, Calif., –43 per cent; Toledo, Ohio, –28 per cent; Akron, Ohio, –26 per cent.

Work Accidents

Deaths from work accidents in October totalled 1,100 or 100 less than in 1957. The total for 10 months was 11,300, a decrease of 7 per cent from 1957.

The October frequency rate per 1,000,000 man-hours in 18 sectional accident prevention contests conducted by the National Safety Council was 5.25, an increase of 5 per cent more than 1957. The 10-month rate was 5.12, a decrease of 3 per cent from 5.28 in 1957.

Public Deaths

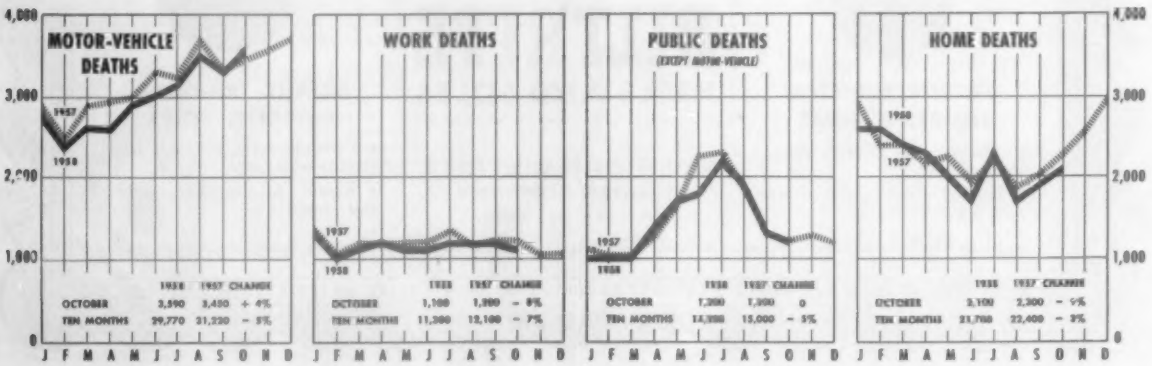
Public non-motor-vehicle deaths in October numbered about 1,200—no change from 1957.

Deaths during the 10 months totalled 14,200, a decrease of 5 per cent from 1957. This reduction occurred despite changes in the definition of Home that have reclassified some cases to Public. There were decreases in deaths from burns, drownings, and falls, and increases in deaths from transportation and firearms accidents. Each age group showed a reduction from 1957, with the largest change recorded for children less than 5 years of age.

Home Deaths

Deaths from home accidents totalled about 2,100, or 200 fewer than in October 1957.

The 10-month death total was 21,700, a reduction of 3 per cent from 1957. Most of the decrease occurred in falls, but deaths from firearms accidents also were down. Small increases were recorded in poisonings, burns, and mechanical suffocation deaths. Increases were reported in deaths of children less than 5 years of age and young people 15 to 24 years old. Other age groups showed decreases. Most improvement was for persons over 64.



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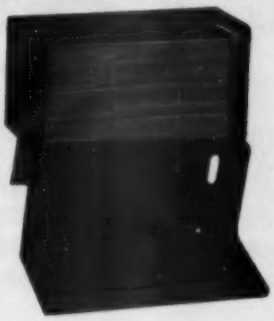

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NEVER NEEDS
TO BE REPAIRED

Dispensers shown in open position.

Magic Heavy-Duty Cleaning Station is for dirty, oily areas or where Anti-Fog protection is needed on plastic or any eyewear. The Heavy 20 gauge steel Dispenser has no moving parts, locks with a key.

Magic Lens Cleaning and Anti-Fogging Fluid comes in pressure cans; no pumps or plungers; no refilling; no bottle troubles or breakage. 1400 applications per can.

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Magic Lens Tissue.....Carton $8.40 (Six 800 sheet refills per carton)	Heavy Duty Paper.....Carton $11.60 (18 giant 760 sheet refills per carton)	Magic Heavy-Duty Dispenser.....each $5.95 (Free when exchanged)
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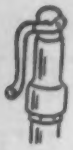
THE SAFETY VALVE



Nothing human is alien to me

—TERENCE

INSTITUTIONS AND MEN

EMERSON'S ESSAYS are full of quotable stuff, and one of his widely circulated aphorisms is that "An institution is the lengthened shadow of a man."

Sydney J. Harris, penetrating columnist of the *Chicago Daily News*, calls that statement "A brilliant half-truth that obscures the other half."

An institution, Mr. Harris reminds us, is also greater than the sum of the men who make it up. This is in line with the thoughts of Crawford H. Greenewalt quoted on this month's editorial page. We're sorry we couldn't present Mr. Greenewalt's lecture in full.

Many people have wondered how some firms manage to stay in business when the brass, individually, seem to have nothing on the ball. The president is a dope, the vice-president a stuffed shirt, and the office manager an unimaginative robot.

This can be explained, says Harris, by a phenomenon which medical men (theologians, too) call "synergism." This rule states that the combined action of several elements is greater than the sum of all of them taken separately. It's just like that well-known headache remedy which is claimed to be more effective because it's like a doctor's prescription—a combination of ingredients.

The same principle holds true in the chemistry of human relationships. The combination of personalities and abilities produces a result that can't be explained by analyzing each man as an individual.

Panning the company is a favorite sport wherever people are employed, and their judgments are often rather harsh. Young, impatient minds are apt to exaggerate the stupidity of their elders. But the principle of synergism is quietly at work, compensating for individual deficiencies and producing a result that seems almost a miracle.

Of course, Mr. Harris points out, the perils of organization are many. Mustiness, red tape, unfairness to subordinates, and a clumsy chain of command can prove fatal. But these defects should not blind us to the possible virtues of organization and the knowledge that an institution can have vitality, stability, and creativeness, if it employs its human assets wisely.

ADVICE TO A NURSE

And last, not least, in each perplexing case
Learn the sweet magic of a cheerful face,
Not always smiling, but at least serene
When quiet and anguish crowd the anxious scene.
Each look, each movement, every word and tone
Should tell the patient you are all his own;
Not the mere artist, purchased to attend
But the warm, ready, self-forgetting friend
Whose general presence in itself combines
The best of cordials, tonics, anodynes.

—OLIVER WENDELL HOLMES, M.D., 1849

THINK WALKING'S CHEAP?

WELL, THINK AGAIN. William Feather figures the cost at 8 cents a mile. Here's the breakdown:

Replacing rubber heels cost him $1.75. His repairman picks up the shoes and delivers them repaired. (Cash and carry, it's $1.50 or less.) You can't expect more than 30 miles from a pair of heels. At 50 miles whole soles may be needed—at $8. Eventually the shoes give out completely—then 20 bucks for a new pair.

A less obvious cost is that of linen in hot weather. A brisk walk means a shower with soap and towels, which also cost something. Walking barefoot in shorts might cut the cost almost to zero—if you didn't pick up any splinters.

At my scale of living, the cost would be roughly half that of Mr. Feather's.

What prompted his cost analysis was a statement that four persons could travel in a rented plane for four cents a mile each—which compares favorably with any other form of transportation, except walking.

So, now when I walk over to the North Western station instead of paying 11.25 cents for a ride on a C.T.A. bus, I don't kid myself that I'm saving money. But the benefits of exercise and fresh air ought to be worth the extra cost.

SATIRE IS AN ART

THE BEST FABULISTS have been the greatest satirists; satire (as with Aristophanes, Voltaire and Swift) is a high and subtle art, quite beyond the barnyard snipings and wholesale geese slaughterings of the present degenerate age. Great satire needs the substance of a great fable.—THOMAS WOLFE—in *The Face of a Nation.*

* * *

Unless you're in the same league as the big three mentioned by Mr. Wolfe, better leave satire alone. It's a sure way to lose friends and alienate people.

Carman Fish

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ATLAS SLING*
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The most flexible sling for its strength, even in the largest sizes!
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Braided body resists kinks, snarls, or sets.
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Made of 2 uniformly braided ropes — one right lay, one left lay. Each rope shares the load.

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INFORMATION FOR SAFETY DIRECTORS

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Use quality floor waxes containing Du Pont's anti-slip ingredient

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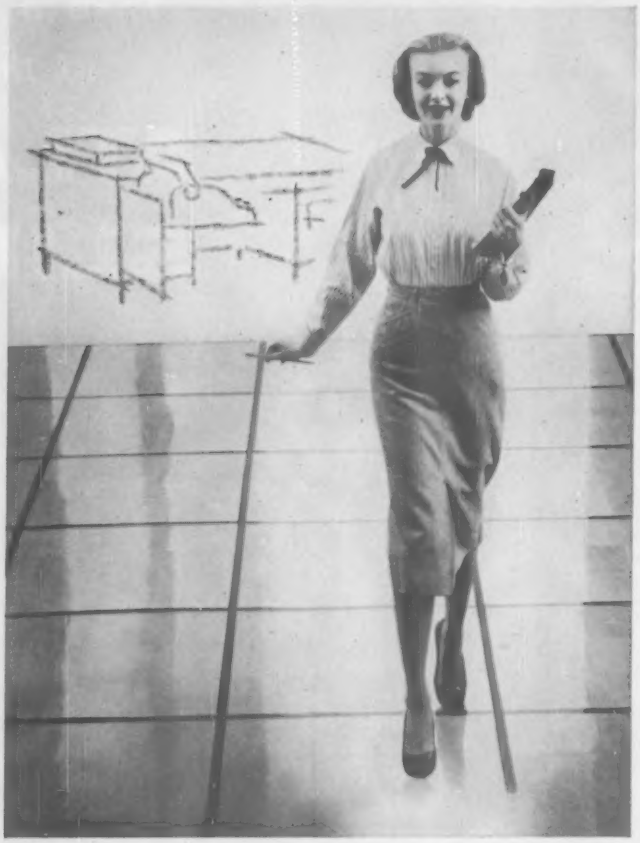
COLLOIDAL SILICA



You benefit two ways with floor wax containing "Ludox": First, there's the skid resistance "Ludox" adds. Tiny, transparent spheres of "Ludox" exert a snubbing action with every footstep . . . give sure-footed traction. Second, you get the lasting beauty wax can give your floors . . . and it's easy to *keep* floors beautiful, because scratches and scuffs can be buffed out, without rewaxing.

Be sure to have your maintenance man use a floor wax containing "Ludox", Du Pont's anti-slip ingredient . . . give your floors the appearance you want, plus added safety underfoot. Fill out and mail coupon below for more information and names of products containing Du Pont "Ludox".

Double-action rug and upholstery shampoos—a new use for LUDOX®—New shampoos containing "Ludox" *clean and treat* rugs against resoiling in just one application. "Ludox" fills microscopic fiber crevices . . . protects surface so dust and dry dirt don't cling. Dirt stays on surface for easy removal.

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Circle Item No. 10—Reader Service Card

news briefs

Safety First

Although he has never served on a safety committee, Dr. Safety First of Tulsa, Oklahoma, practices safety so assiduously that he has never been in an accident. Dr. First's father named him after the most widely known safety slogan of all time.

Eye injuries

60,000 of the eye injuries that occur annually in industry are serious enough to cause temporary disability, and 12,000 of these cause some permanent damage. Nine out of ten of the injuries could have been prevented through well known precautions.

Lower ceilings o.k.

Researchers at the Israel Institute of Technology discovered that good comfort and health is possible with lower ceilings. Though their findings conflict with popular belief, they found that eight-foot ceilings would save about five per cent in building costs in that raw-material-poor nation, and would be satisfactory for human habitation in their hot climate.

Vapor warning device

A cathode tube, sensitive not only to fire but to smoke and vapor, shows promise for a furnace safeguard and to give advance warning of fires and conditions that might lead to explosions.

Old Ironsides

A new "iron room" being built at Hanford Atomic Center will be built of old steel taken from stocks of naval armor plate rolled before World War I. Reason for using old steel is—radioisotopes, which for this purpose, would "pollute" new steel, have decayed in the old steel and make it more valuable for shielding. The room is intended to house equipment to measure radioactivity in human tissue.

Clearing the air

The Air Pollution Foundation reports that in two more years, smog research in Los Angeles will move from the basic to the applied stage. The Foundation claims: "Formation of ozone (basic L. A. smog ingredient) from auto exhaust is not affected by amount of olefins in gasoline, as contended by some. Olefins are classed as hydrocarbons as are paraffins, aromatics, and naphthenes."

The old switcheroo

Recently a freight handler grabbed a large bag and set himself for a difficult lift. The bag was empty, and he tore a back muscle.

Noise measurement

A newly developed system for sampling industrial noise levels accumulates the sound intensity levels during one-second intervals and distributes them to instruments. The instruments record them so they may be studied as to source and frequency.

Industrial hygienists needed

We have only a fraction of the number of industrial hygienists we need, according to one spokesman in the field. New technology has brought new hazards in our generation. Three-quarters of the working population is now unprotected from toxicity hazards, and the hazards are still increasing.

Get-tough approach

The British National Union of Mine Workers is taking an approach to mine safety far tougher than any proposals yet brought forth in the United States. They recently had a recommendation that a miner who carried smoking tobacco and matches into closed-light mines should be fired on the spot and permanently blacklisted.

Jim Saul

TV Eyes Watch Atom at Work

Shielded from harmful radiation, hot lab technicians control operations through closed-circuit television

WHERE hazards of radioactivity are—or may be—present, closed-circuit television is providing new eyes and greater safety for scientists and engineers.

This application of TV has proved its value in two years of monitoring the steam-pressure and water-level gauges of the Experimental Boiling Water Reactor (EBWR) at Argonne National Laboratory, Lemont, Ill. Now producing electricity for laboratory uses, EBWR is the prototype for nuclear power plants under design for industries and utilities.

Still under development is three-dimensional closed-circuit television, currently being tried out on the Argonne slave-robot—a half-ton electronic automaton able to perform almost-human functions under conditions of intense radioactivity.

This slave-robot was on exhibit during the Second International Conference on the Peaceful Uses of Atomic Energy at Geneva, Switzerland, in September 1958. An Argonne display of electronic manipulators, or mechanical hands for handling radioactive materials, with stero-television eyes was a feature of the 1958 Brussels World's Fair.

The Laboratory's Remote Control Engineering Division began experimenting with three-dimensional television in 1950. Several approaches were tried to obtain stereoscopic images. Some techniques involved transmission of a pair of images by a single camera chain to a single receiver, where they would appear side by side and could be viewed through an apparatus resembling the old-fashioned stereoscope.

Another approach included the use of two complete camera sys-

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CO-AUTHORS of this article are three staff members of Argonne National Laboratory, Lemont, Ill.: William M. Thompson, associate electrical engineer, Remote Control Engineering Division; Walter C. Lipinski, and Thomas R. Spalding, associate electrical engineers, Reactor Engineering Division. The Laboratory is operated by the University of Chicago for the U.S. Atomic Energy Commission.

SCENE in the control room of the Experimental Boiling Water Reactor at Argonne National Laboratory as it was loaded with nuclear fuel to self-sustaining criticality, December 1956. At the rear is the 15-in. monitor for EBWR's closed-circuit television system.

MECHANICAL HANDS with "feel" and television eyes exhibited by Argonne at 1958 World's Fair in Brussels. Electronically controlled master-slave servomanipulators enable an operator to perform work with radioactive materials behind heavy shielding. Manipulators are controlled so the operator can observe her work directly through a heavily shielded window or she can watch stereo images from two closed-circuit cameras.

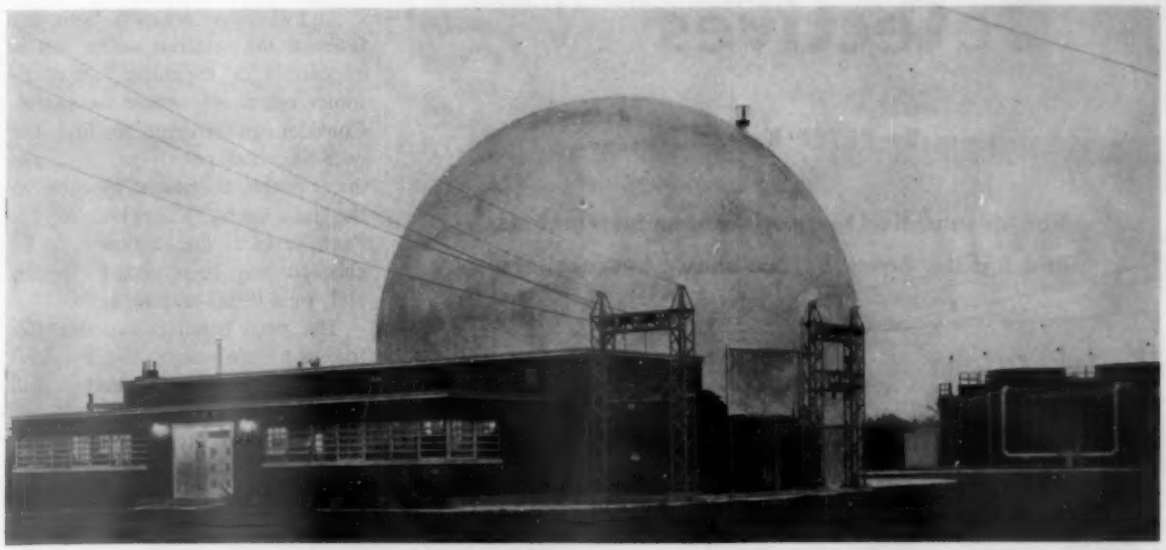
ADJUSTING lens of closed-circuit television camera mounted to monitor steam pressure and water levels. Camera is set to view a water level glass and a pressure gauge attached to reactor pressure vessel.

tems. Two pictures from these cameras are superimposed on each other with a mirror system. When the operator wears polaroid glasses, he sees the right-hand picture with his right eye and the left-hand picture with his left eye. The effect is similar to that of the three-dimensional motion pictures, which enjoyed a brief period of popularity in the United States.

(For its Geneva and Brussels demonstrations Argonne selected the superimposed-picture approach, using two vidicon-type camera chains.)

The experimenters encountered

—To page 44



CLOSED CIRCUIT TELEVISION helps control this nuclear power plant. It is the Experimental Boiling Water Reactor, operated by Argonne National Laboratory.

MEASURING thickness of metals and plastics ultrasonically from one side while recording it. With suitable attachments, this unit can be set up to take corrective action automatically, as in keeping dimensions of machined parts within preset limits.

Ultrasonic Detectives

By PETER K. BLOCH

Non-destructive tests with these instruments find hidden flaws before they cause failure

ARMED with ultrasonic resonance gauges, today's safety engineer is ferreting out potential accident-causing flaws, especially those created by corrosion, internal gaps in metal, or related defects.

Ultrasonic detective work is unearthing imperfections invisible to the eye, averting mishaps that might maim or kill personnel and damage plant equipment.

The net gain is prevention of accidents costly in human suffering and financial loss through forced, unexpected plant shutdowns.

Unpredictable, explosive rupture of an acid or steam vessel, as a result of corrosion, is an expensive possibility whenever a metal holds a fluid under pressure. This exists whether the vessel is an oil tank, boiler tube, or chemical process piping.

Ultrasonic resonance gauging takes much of the danger and surprise from corrosion damage, and considerably reduces the expense. For instance, the Standard Oil Company of Ohio uses this method to locate corrosion in piping and tank walls. By checking periodically, the firm's technicians have almost eliminated the hazard of leaks; excessive corrosion is spotted before it becomes dangerous.

Before real trouble develops, a shutdown can be scheduled conveniently, when all repair personnel and equipment are at hand, ready to quickly correct the fault.

And whenever access to both surfaces of the material under test is impossible or expensive, an ultrasonic resonance gauge is useful. Consider an attempt to find the wall thickness of a pipe. A transducer probe, connected by cable to the instrument, is applied to the work surface; the thickness to be checked may be recorded immediately on a direct-reading scale.

The gauge is non-destructive. Before using ultrasonics, the Philadelphia Electric Company had to drill into boiler tubes to test for corrosion. With one type of ultrasonic resonance instrument, the Vidigage, tubes go unharmed during testing; and floor plates in gas holders do not have to be ripped up to find possible trouble.

PETER K. BLOCH is President of Branson Instruments, Inc., Stamford, Conn.

As fast as the operator can apply the probe, readings can be obtained on this gauge. Although one man usually can operate the device, two men can work more efficiently when a large area is involved, such as the sides of an oil tank or long lengths of pipe. In this event, one worker logs the reading shown on the instrument's screen; his helper, carrying the transducer probe, may use auxiliary cables up to 1,000 ft. long to quickly check large sections of equipment.

The aircraft industry uses ultrasonics to increase flight safety. Today, 16-ft. wing skins are often milled from a single slab of aluminum.

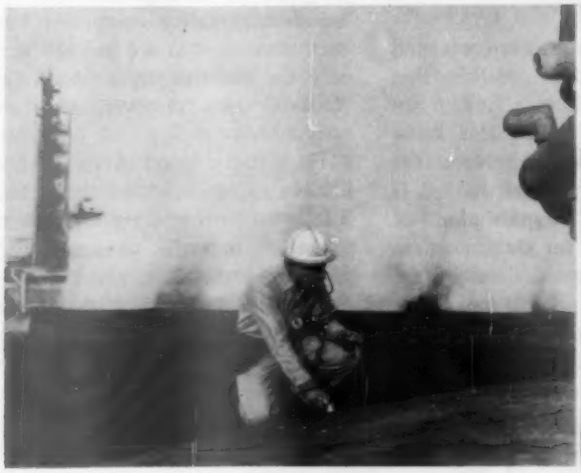
This creates a special problem. Wings must be built with great accuracy, for either a *heavy* wing or one that is too thin is dangerous. Yet, since one side of the wing rests on the milling machine bed, the

—To page 62

TOP: Ultrasonic testing of army satellite nose cone. Trace on instrument's cathode-ray tube indicates thickness directly.

MIDDLE: Aircraft wings from outside suppliers are checked against specifications. Instantaneous readings, showing as vertical lines on instrument's screen, are shown by placing transducer on only one side of wing. Instrument accuracy is within 0.001 inch.

BELOW: Two-man team checks vast areas of tank surface for corrosion with ultrasonic resonance gauge. Operator (right) notes instantaneous thickness reading on screen while assistant, up to 1,000 feet away, applies probe to metal. Communication is through sound-powered telephones. (Photo by Standard Oil Company of Ohio.)



Where Would We Be Without Safety Equipment?

By W. J. M. REDWOOD

Personal protection is proving its worth every day—but industry could get still more value from available equipment

"MAN in a few seconds can destroy that which has taken years—even centuries—to create," said a philosopher, Andreas Reischek, back in 1875.

In 1958 men are still destroying the two things needed to earn a living—themselves and their equipment.

Much of this loss could be prevented through use of the protective equipment now available for practically every occupational hazard. This happy situation is the result of skill, time, and money invested in research and development.

Sales of safety products have been increasing for these reasons:

1. Service and follow-up by suppliers.

2. Liberal cooperation by industry in making available the facilities for plant application.

3. Doctors, optometrists, engineers, and scientists have played an important part in the development and application of protective devices. Public confidence in protective measures is well established.

HANDLING MOLTEN METAL requires head-to-foot protection, including hard hat, melters' goggles, metal mesh face shield, and flameproofed garments.

4. By no means least is the willing cooperation of production workers; The influence of this group on their fellow workers continues to be an essential part of a safety program.

Equipment manufacturers and safe workers both realize that *mental* protection is a human relations problem. They also know that the last barrier between the employee and the work hazard is the individual's appreciation of what is provided for his protection. All the guarding devices in the world will not prevent an injury unless put to use.

The factor of individualism is still the greatest problem in accident prevention. It is generally recognized that safety measures are accepted by about 70 per cent of the employees. The remainder require compulsory measures—especially for personal protection.

Industrial safety equipment has been developed to the point where only the diehards argue about the "looks" and "disadvantages" of safeguards.

Each day a good driver checks his brakes, wipers, and lights before starting out. By the same token, the industrial worker should go through the same check before he starts a job—safety shoes, eye protection, hand and leg protection, hard hats—whatever may be needed for the particular job.

Industrial workers must be prepared for the unexpected as well

---

W. J. M. REDWOOD is Safety Supervisor, Algoma Steel Corporation, Limited, Sault Ste. Marie, Ontario. This article was prepared for the Industrial Safety Equipment Association, Inc.

THE WISE OWL CLUB now has 57 members at Algoma Steel, with a total 64 eyes saved from partial or total loss of vision.

HARD HATS are worn by 4,500 Algoma Steel employees, including 23 Turtle Club members whose skulls are still intact because of head protection. The tag is another precaution—simple but important.

as routine hazards. With most protective devices, training is needed to develop appreciation of their full value. Production training also needs safety instruction. We must not forget the time, money, and ingenuity spent in the development of our safety devices.

Let us consider one common, taken-for-granted item—the steel toe cap. Most of us can recall the early toe cap—a rather crude job incorporated in heavy shoes of unattractive appearance. Today, many men have no footwear without steel toes. The executive or the laborer can obtain shoes to suit his tastes and at the same time comply with safety requirements.

Evidence of protection. The Wise Owl Club, according to recent reports, now has a registered membership of more than 15,000. This club, sponsored by the National Society for the Prevention of Blindness, is composed of men and women whose vision has been preserved by eye protective devices.

How many of the members would now be blind, in one eye at least, if they had not worn eye protection? At Algoma Steel we have 57 Wise Owls. From personal examination of the eye protection worn by them, I would say that 60 per cent would have suffered loss of vision in one eye and two would have incurred total blindness.

The Turtle Club has for its slogan, "Shell on head, we're not dead." Today in Algoma Steel some 4,500 people wear hard hats —just about the number of hats worn in all of Canada and the United States in 1922. We have 23 Turtle Club members and I can vouch for it that several of our Turtles would be six feet underground but for hard hat protection. It is estimated that there are now more than 12,000,000 hard hats in use in North American industry.

The foregoing brings to mind: Why do we need to be jolted into doing a safe job? Why is it that after a serious accident or series of accidents we suddenly become full of good intentions?

It is truthfully said that "experience is the best teacher." Some experiences are sad indeed. Surely we have had enough experience to have taught us the answers, particularly when safety equipment is available. Could it be that we have not listened to the advice of those now gone, or those still with us who have been the victims of unsafe conditions or unsafe practices?

Should we legislate personal safety equipment?

Why not? Our laws require that automobiles have brakes, wipers, headlights, and so on. Regulations specify safety measures for petroleum processing, guards for machinery, and dust control.

—To page 54

By J. LLOYD BARRON, C.E.

Where Does Sanitation Belong?

Is it just an extra job for some production department? Or is it separate in its management yet integrated with plant operation?

INDUSTRIAL SANITATION, in its broad concept, means the physical maintenance of the workplace, not just in manufacturing plants but in every place outside the home where people are assembled for business, travel, education, worship, national defense, entertainment, health—even detention.

It is, therefore, a factor as big as industry and business and all our sociological activities. It serves a high percentage of the 65 million persons employed in this country, and millions more who receive the services of the employed.

Industrial sanitation is just beginning to be recognized for what it is—a vital element in producing goods and providing services. It is economically significant, bearing on human health and well-being and engaging the thought and energy of millions of persons.

Yet in some corporations there is too frequent turnover of supervision and a tentative, rather ill-defined approach to sanitation. The reason probably lies in three circumstances:

1. Management doesn't clearly comprehend the meaning and place of industrial sanitation in the plant organization and operation.

2. Management personnel assigned to the function do not understand the job fully or have adequate supervisory and technical backgrounds for its handling.

3. A combination of the above factors, leading to failure to separate the function and then to make it an integral part of plant operation.

Obviously, the function of industrial sanitation has received some degree of recognition and acceptance. But in how many corporations is it established as distinct and recognized as indispensable?

Separation before integration. Currently, the word integration is

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stirring some strong reactions, but here we use it in its simplest connotation—fitting one part into other parts to make a smoothly operating whole. However, a condition necessarily preceding integration, or coincident with it, is separation. Integration of the amorphous or the ill-defined is difficult. If we are to integrate sanitation in the plant operation, it must be recognized, at least in its basic purpose and outline, by those responsible for plant administration.

There is no problem in seeing production for what it is, whether in a factory making automobiles or on a railroad selling transportation. There is also no difficulty in perceiving maintenance of machines and of power, light, and heat in the workplace as a basic function.

But what of the workplace itself? Is it a part of production or of machine maintenance to keep a plant clean, orderly and safe? Or is it a third parallel function—industrial sanitation—which should relieve production and mechanical maintenance of a distinctly different set of tasks and deal with them as its prime function?

Some degree of maintenance of the work environment is needed to avoid fouling it beyond use. Unenlightened top management may hang a part of this maintenance on production, some of it on mechanical maintenance and leave a part floating. This may not involve any particular planning; it is more likely an unthinking following of past patterns.

Management may be jolted by one or a combination of circumstances, such as product damaged by plant soil, a bad safety or hygiene situation, low employee morale, union protests, or pressure of official agencies. In some cases the push may be from efficiency surveys to discover what's wrong in plant operation.

Whatever the cause or condition, a major improvement is available to any management that will first recognize and separate industrial sanitation from other plant functions, and then integrate it into plant operation under competent supervision.

Management needs guidance. Management decisions may grow out of sheer logic or the desperateness of the situation, or from outside pressure, such as that of the Food and Drug Administration in the food, beverage, and pharmaceutical industries. Or one executive learns from another that many diverse tasks can be grouped and supervised in a single operating unit with increased efficiency for the whole operation.

I regret to say that the executive will not get much help in this problem from the big management associations. In spite of their elaborate seminars and training courses, the organizations have failed to grasp the meaning of industrial sanitation or to realize that it requires separation, analysis, and managed integration to secure its full potential benefits.

In many of our heavy industries, industrial engineers and efficiency experts are analyzing not only production practices and machine maintenance but also the tasks that make up maintenance of the work environment. Too often they study the parts and perhaps make some improvements, but fail to put these parts into context as industrial sanitation so that the advantages of unified supervision may be realized.

It has not been so easy for the food industry to ignore the logical approach to sanitation. In varying degrees, food quality is dependent on plant sanitation. Official agencies maintain strict surveillance over the preparation of food. Yet there are thousands of food-processing plants and sales companies in which the word "sanitation" is not to be found in a supervisory job title or applied to a plant function.

Quality control, carried on

—*To page 56*

BUDGET

WHAT's with this budget jazz, Clyde? You keeping on top of the money drag?

Average earnings in manufacturing are $85 a week, and those who know say a worker who earns this amount doesn't usually start making money for himself until about Tuesday noon. The pay for a day-plus each week goes for local, state, and federal taxes.

Ever itemize your contribution to the nation's economy? Check how many fingers dip into the till to the detriment of Big Daddy?

Educated guesstimates of your loot distribution say about 25 per cent, or the pay from at least one week of work each month, goes for shelter. Another week, or about 30 per cent, goes for food. One week keeps the tax collector happy, and the fourth week is all your own to spend as you please keeping civilized.

Civilization requires about two days' work to support the car and another couple days for clothing. By the time you pay for insurance, medical care, tobacco, booze, and other necessities, you're just about out of mad-money.

Nobody really cares how you spend your money, as long as you don't disturb the peace or corrupt the public morals. With accidents having occurred to 1 out of every 18 citizens last year, and costing about $68 for every citizen, it bodes a good chance that you'll dissipate your resources and disturb the peace by being the star in an episode of "this is your life" this coming year.

Everyone tries to keep up with the Joneses—but can you afford an accident just because Jonesy can?

ROBERT D. GIDEL

AERIAL VIEW of Tennessee Copper Company's Copperhill plant.

Labor and Management Point with Pride

to the results of eight years of joint safety effort at Tennessee Copper Company

By B. F. HYDE

ON THE FIRST DAY of each month representatives of labor and management of the Tennessee Copper Company meet in the interest of safety. This labor-management safety committee has contributed greatly to the safety accomplishments of the company during the past eight years.

For the eight-year period 1950-57, the frequency of accidents was 3.45 per million man-hours, as compared with the average of 12.75 for the 10-year span 1940-49.

B. F. HYDE is a member of the Safety Engineering Department of Tennessee Copper Company, Copperhill, Tenn.

Formed in 1950, Tennessee Copper Company's Central Labor-Management Safety Committee keeps its attention focused on an area in which labor and management can discuss objectively a non-controversial subject—safety.

Members of the labor part of the committee represent all company operations and are selected by local union presidents for a term of six months. The company's safety director, Sam E. Sharp, is chairman, and one of the safety engineers is secretary. Minutes of each meeting are mailed to members immediately after the monthly conference for use in weekly crew safety meetings.

Discussion at the monthly conferences includes accident experience, accident cause analysis, new developments in safety and hygiene problems, and cooperative enterprises.

Handling suggestions. One prime objective in the conferences is to stress the importance of cooperation in safety matters at the workman foreman level. Suggestions concerning specific conditions are discussed only after they have been taken up with foreman involved, and there has been no action or acknowledgment. These monthly meetings are not for soliciting safety suggestions.

Procedure for handling safety suggestions is:

1. Discuss the suggestion with the immediate foreman (including the 30-minute weekly crew safety meetings).

2. Discuss it with the safety engineers.

3. Bring it before the departmental labor-management safety committee (which also meets monthly). Then, provided no satisfactory action has been taken to remove the hazard, or no explanation given in the preceding three steps:

4. Bring the suggestion to the Central Labor-Management Safety Committee.

At each meeting of the central group a period is devoted to discussion of safety suggestions. At the beginning of each meeting answers are given to safety suggestions originating at the previous conference. The chairman makes no attempt to give an answer to a suggestion in the meeting at which it is brought up.

Handling suggestions in this manner has been found satisfactory because:

1. It aids cooperation between workman and foreman.

2. A safety suggestion should not be held for the regular monthly meeting, because an accident might occur in the meantime.

3. It gives an opportunity to communicate the broader objectives and provides time for training during the regular 1½-hour monthly committee meeting. Instead of being an instrument for making suggestions, the committee's prime purpose is that of training.

Program planning. Programs are planned for a half-year cycle to provide maximum training for the greatest number of employees. On the committee there are 15 members representing labor, while 6 from the Safety Engineering Department represent management.

There are six basic subjects for discussion during the six-month period: Fire Prevention, Mechanical and Physical Hazards, Maintaining Interest in Safety, Housekeeping, Safety Program Audit and Check-up, and Engineering for Safety and Efficiency.

The Central Labor-Management Safety Committee has been invaluable, not only in securing acceptance of safety measures but also in promoting a better understanding between management and the unions, and among the unions themselves.

Departmental committees. There are also departmental labor-management safety committees which meet monthly, with a department head or assistant as chairman and a safety engineer as secretary. Shop stewards attend, and the agenda is similar to that of the central group.

Periodically these departmental committees make safety inspections of the physical facilities of their departments. These inspections vary in length from one day to one week. Suggestions are recorded, and members are informed of final disposition.

Since the formation of the committee structure in 1950, records show the company, its plant units, and individuals have received 175 Certificates of Honor from the Joseph A. Holmes Safety Association.

—To page 53

IMPOSING ARRAY of safety awards at annual meeting of Tennessee Copper Company's Labor-Management Safety Committee. Among the awards are plaques and certificates from National Safety Council, U. S. Bureau of Mines, and other organizations. Right: Sam E. Sharp, TCC safety director.

How to protect operators' health when

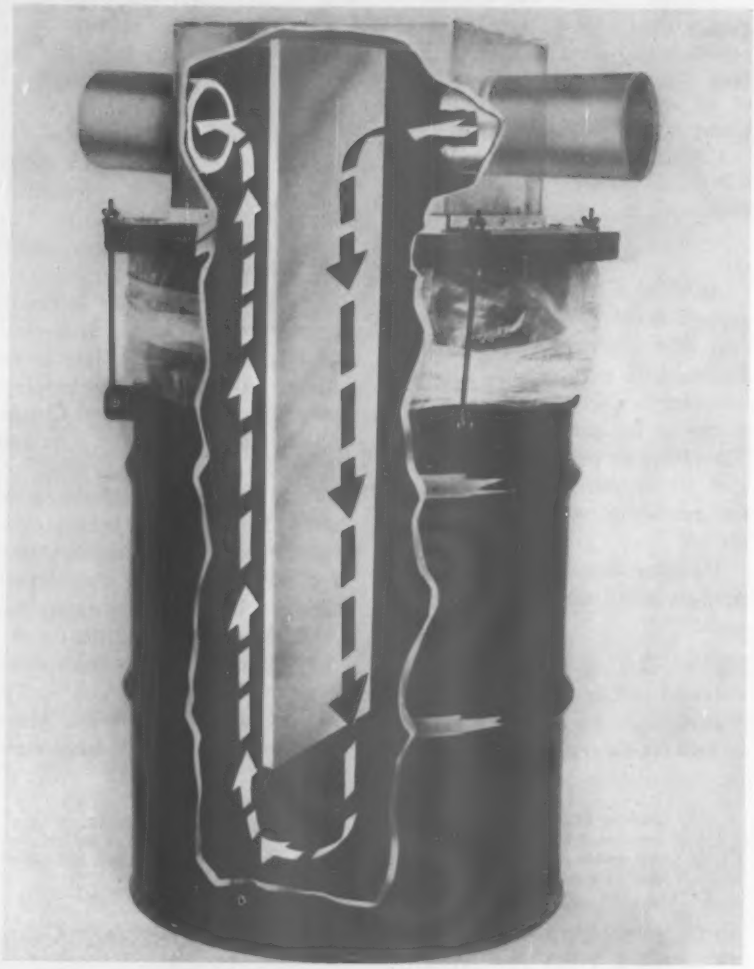
Machining Beryllium

By J. W. KENT

LIGHT WEIGHT, high melting point, and durability make beryllium desirable for use in missiles and aircraft. However, minute dust particles, produced when machining beryllium, can cause lung disorders. It is therefore necessary to protect the health of personnel assigned to the machining of beryllium and beryllium alloys.

A safety program must be adopted and rigidly followed. Methods of atmospheric control, waste disposal, and personnel procedures must be developed, as well as educational and medical programs. Early in 1957, the Research and Advanced Development Division of the Avco Manufacturing Corporation undertook such a program following rigid federal, state, and industrial-hygiene standards concerning the maximum concentration of beryllium.

Maximum Allowable Concentrations. The average in-plant atmospheric concentrations of beryllium or its compounds through an eight-hour day should not exceed two micrograms per cubic meter. Although the daily average might fall within the above limits, personnel should not be exposed to a concentration greater than 25 micrograms per cubic meter for any period, however short. In the immediate area surrounding the plant machining beryllium compounds, the average monthly concentration at the breathing-zone level should not exceed 0.01 micrograms per cubic meter.



BAFFLED collection barrel in individual hose lines traps heavy beryllium particles; large particles continue in airstream. After separation in cyclone-type separators, cleaned air is exhausted to atmosphere at roof level.

Contaminated Air Removal and Filtering. To maintain work area and out-plant concentrations within these limits, a high-velocity, high-efficiency exhaust and filter system is used. At the point of machining operation, the air is exhausted through 5-in. "sucker hoses." The face velocity at the hose is maintained between 3,500 and 5,000 fpm. (477 to 681 cfm.), varying with the number of hoses used. The system is designed for maximum use of six hoses simultaneously.

To salvage pure beryllium and to meet restrictions against contamination imposed by the salvage reprocessors, a baffled collection barrel has been installed in the in-

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dividual hose lines to entrap heavy beryllium particles. This barrel collects large particles of waste beryllium, permitting the smaller particles to continue in the air stream.

The stream is drawn through a series of five cyclone-type separators, where the comparatively heavy particles are collected, leaving the finer particles to continue into a Cambridge Absolute Filter system. The cleaned air is then exhausted to the atmosphere at plant roof level.

WHEN MACHINING BERYLLIUM:

. . . Monitor and control air contamination

. . . Provide adequate waste disposal

. . . Initiate medical and educational programs

Control Measures. To ensure that atmospheric concentrations are maintained within allowable limits, the Avco Safety Section continually monitors breathing zone and general area air. At the outset of the program, a safety representative spent full time in the area monitoring new machine operations and material-handling techniques. Breathing zone and general air samples are collected on Whatman No. 41 filter media using high-volume air samplers. Sampling rates are 25 cfm., with sampling times from 5 to 30 minutes.

In addition, six sampling heads containing Millipore filters, operated at a rate of 10 liters per minute for eight-hour periods, are maintained throughout the area. One of these heads, located inside the roof stack, checks outside atmospheric pollution.

The safety section makes weekly inspections of the area and the exhaust equipment and also observes the use of personal protective equipment. These inspections include measuring "sucker" hose velocities; checking the physical condition of hoses and connections; smoke-testing the air currents; and checking the operation of all electrical switches, dampers, and mechanical facilities.

Sampling Analysis and Results. To avoid exceeding the low allowable concentrations and to prevent gross contamination before detecting a malfunction in the exhaust system, a chemical analysis group determines the content of the air sampling filters. Through the use of spectrography, results of the air sample are received in a relatively short time, and corrective steps can be taken promptly on notification by the chemists that tolerance levels are being approached.

Room atmospheric levels are generally maintained to the hundredth of a microgram per cubic meter per eight-hour range. An occasional impingement on the sampling media or incorrect placement of hoses at the point of operation will indicate that the maximum allowable concentration is being approached.

When this happens, an immediate warning is given all personnel concerned, and a thorough inspection of conditions is made until the cause is determined and eliminated. Follow-up samples are taken and analyzed to assure the proper corrective measures were taken. The safety section has the authority to shut down operations whenever evidence of contamination is present.

Waste Disposal. Since beryllium particles in waste materials may become air-borne, controls must be continued beyond the plant to ensure public safety. Burial underground, burning, and open dumping are to be avoided. All beryllium waste containers, including those in the area used for waste paper, rags, and scrap, are conspicuously labelled and, when filled, are sealed for pickup by a marine disposal company. The disposal company encases the sealed containers in concrete and disposes of them at an AEC-approved burial area at sea.

Physical Layout. Avco's beryllium machining area has been laid out to isolate the area from the other general machine and laboratory operations. Partitions are dust-tight, with make-up air in the work room provided through filtered louvers. Spaces under the doors are weatherstripped, and the area is checked by the safety section to ensure negative pressure is maintained. Dry boxes, tied in to the exhaust system, are used in the handling of powdered beryllium.

Because of the personnel control problems, a separate hygiene area is located adjacent to the work area. Hygiene facilities consist of a locker room, shower room and change room, the latter being the passage to the machining room after special work clothing has been donned. In this room, workers leaving the area remove contaminated clothing prior to entering the shower room.

Personal protective equipment, consisting of a complete change of clothing, is maintained for personnel in the area. Underwear, socks, jumpers, caps, and shoes are conspicuously labelled to ensure they are kept in the area. A smock and pair of marked rubbers are provided for visitors.

Soiled clothing, removed at the end of the work shift, is placed in a drain barrel and wet down by the individual. A washing machine and dryer are continuously operated in the change room to ensure availability of clean clothing. Personnel are required to shower before

—To page 48

(Fiction)

Paper work can save a lot of leg work, and hours spent at a desk can be productive, our Safety Engineer finds

Morning at the Desk

By BILL ANDREWS

February 4, 1959

OUTSIDE the day is dark, dismal, and sloppy. The muddy pools of water left by thawing snow are being whipped by blustery winds, and the dark clouds are driving across the sky, heavy and low.

It's a good day to be inside the office doing a desk job.

Can a morning of riffling papers ever be a creative one? I didn't use to think so. I used to think a man had to be on the go, on his feet, exploring, inspecting, meeting people. Paper work was something to shove off on clerks and junior safety men.

I think the trouble was that I never learned to get the most out of paper work. Now that I'm restricted by a bad heart from much work on the shop floor, I'm learning something about the uses of quiet hours at the desk.

Take today, for example. I spent the first hour, before the mail came, going over the inspection reports of my two assistants. They had turned up no scandalously bad situations. But it was a little surprising to see a mildly negative report on housekeeping in Smith and Henson's shop. The surprising thing is that Antonelli, the general foreman, is a fanatic on housekeeping — he even has someone shine the brass plates on some of his machines.

So I asked questions, and I learned that Antonelli was sick with pneumonia. This produced two actions by me. The first was to drop him a note and tell him I'd stop in to see him. Tony is not only a housekeeping fanatic—he's a convert to serious and enlightened safety work. Also he's a swell guy.

Second, I arranged to have one or the other of my assistants get into that shop daily. The assistant foreman is an apathetic and ineffective person, and I want to be sure that the new safety standards there (especially in the handling of acids) don't slip during Tony's absence.

There were some other things to follow up on, and the hour with the inspection reports was certainly fruitful.

Then came the morning's mail. There were a couple of safety equipment catalogs to look over and a press release from a maker of plastic shields for grinding equipment. The release made some rather extreme claims, suggesting that the shields made goggles obsolete.

On the other hand, the photos that came with the release showed some interesting design features I might be able to use. So I dictated a letter to the company, protesting the anti-goggle line of the release, and asking for more data on the shields.

There was a letter from Harry Dexter, who used to be my assistant and now has my old job at Jackson-Barnes. He has a problem in the material-handling area, and he sent along some sketches for revision of the layout of a loading dock.

It was a fascinating problem, and I spent 20 minutes studying it. In the end, all I could tell Harry was that I thought, with one minor change, he had proposed a perfectly workable solution. But if Harry got little help from me, I know somebody on the project that will get plenty of help from Harry.

I shoved his notes and sketches into an envelope, marked them to the attention of the warehouse foreman of a steel barrel plant in Section 23A, and wrote on the envelope, "Here is a solution of a problem very similar to yours. Look it over, and then come in and we'll talk about the application of the idea to your situation."

There was a letter from the placement office of Tech, my alma mater, giving me the records of a dozen boys in the senior class who

seem interested in safety work. Three of them looked very good, and I dropped notes asking them to write me about themselves. If any of them sound promising in their letters, I'll make appointments to see them when I go to Tech in April to give a lecture and try to do a little proselyting.

I need another assistant, and I know of several openings in firms served by several of my good friends in the safety engineering profession.

There was a lot of junk in the mail, and the wastebasket filled rapidly. But the stack of things worth more leisurely study was of respectable size when I finished.

One letter, however, left me deeply unhappy.

During the war I had worked with Jackson Deleter at the ordnance depot. He had been a somewhat unsuccessful mechanical engineer, but he turned out to have some talent in safety work—especially in teaching, public speaking, and promotional activities.

After the war he went with a big producer of processed foods, and he served there long enough to have all his seniors die off or retire. Three years ago he became chief safety director of the whole corporation, and he came to a couple of National Safety Congresses in new suits, a Cadillac, and a confident manner.

He didn't come to the Congress last fall, and nobody seemed to have heard from him.

His letter in today's mail told of his "retirement," by request, on half pension.

In his request to me to give him a job he outlined his past successes in cutting accident rates in a series of plants of the food company. But he admitted that when he took over the top job for the corporation, he couldn't achieve anything. In the last year, he had one bad situation of occupational disease (a dozen permanent total disabilities in a single plant) and two bad plant fires.

He said in his letter that a group of the plant safety men were so jealous of his success that they began to work to undercut him with management. They were, he said, successful, and he suddenly found himself with a heavily-mortgaged $50,000 home, two expensive cars

—*To page 55*

Howard Pyle New President of National Safety Council

HOWARD PYLE was elected president of the National Safety Council at the January 13th meeting of the Council's board of directors. Mr. Pyle, since 1955 a deputy assistant to the President of the United States and former governor of Arizona, succeeds Ned H. Dearborn, who retired Jan. 1. Mr. Dearborn, who becomes President Emeritus, now lives at Titusville, Pa.

In welcoming Mr. Pyle to the Council, Walter F. Carey, chairman of the board, said, "The National Safety Council is delighted that Mr. Pyle could accept an invitation to become its president. He has a background of public service and safety that fit him admirably for his responsibilities with the Council. We feel that we have been extremely fortunate in finding an ideal successor to Ned H. Dearborn."

For the past three years Mr. Pyle has been a presidential assistant directing policy and liaison in the field of federal-state-local government relations. He was primarily responsible for development of the work of the new Joint Federal-State Action Committee for stronger, more responsible local government. He was the planning contact man for the President's Committee for Traffic Safety and the keynoter at many of the national and regional meetings called by the committee.

For more than 30 years, Mr. Pyle has been a communicator in advertising, in radio as program manager and vice-president of KTAR, Phoenix, and as an overseas correspondent in the Pacific during World War II. He reported the Japanese surrender from the *U.S.S. Missouri*, and was the first radio correspondent to land in Japan with U. S. ground forces.

During his two terms as governor of Arizona, he was twice chairman of the Western Governors' Conference. He also served as vice-chairman of the National Governors' Conference Committee for the promotion and formation of the present expanded national highway construction program.

Mr. Pyle is co-founder of the world-famous Grand Canyon Easter Sunrise broadcasts which he has directed and narrated since 1935. As a past president of the Phoenix Rotary Club, and chairman of a million-dollar building fund drive for the Phoenix YMCA, he has contributed to the betterment of his community. He has furthered higher education as a member of the board of regents of the University and State Colleges of Arizona, and as a trustee of Redlands University.

The son of a clergyman, Mr. Pyle is an outstanding lay leader and teacher in his church. He is married and the father of two daughters.

Industrial Hygiene Instruments

A review of commercially available equipment

By WARREN A. COOK, Ph. D.

INDUSTRIAL hygiene instruments in the past have been largely homemade affairs. More and more, instruments have become available commercially, and this trend is increasing.

In recognition of recent developments, a four-day symposium on instrumentation was held at the University of Michigan in 1954. The papers and technical data were put together in an *Encyclopedia of Instrumentation for Industrial Hygiene* which, with illustrations and diagrams, runs to more than 1,200 pages. In this review of commercially available instruments it will be necessary to limit discussion.

TAKING AIR SAMPLES from the worker's breathing zone at work station.

Air Sampling Devices

A number of commercially available instruments may be used for collecting samples of potentially hazardous material from workroom atmospheres. Although the tendency is toward the development of instrumentation which will permit immediate determination of the concentration of hazardous materials, either through direct reading devices or by colorimetric changes, it is still necessary in many cases to collect the sample in an appropriate device and then to examine the collected material under the microscope or to carry on chemical analyses.

Impingement Devices. Probably the most-used sampling device is the small or midget impinger which can be obtained as the less expensive rubber stopper unit or with interchangeable ground glass connections. This instrument is widely used for the collection of dust to be counted by light field illumination in assessing the extent of exposures to the pneumoconiotic dusts. It is not to be used for fume collection in view of its low efficiency for collection of very small particles.

The small impinger has some application for collection of gases and vapors where the contaminant is immediately soluble in water or quickly reactive with the absorbing chemical in the impinger. Examples are hydrogen sulfide and methyl alcohol.

The standard or large size impinger may be obtained commercially as either a rubber-stoppered unit or the more expensive all-glass unit. This device samples air at the rate of 1 cfm.—10 times the rate of the midget impinger. The large impinger is more efficient in view of its higher impingement velocity and may be used for collection of fume as well as dust. However, a single large impinger has an efficiency of only about 60 per cent for fume. Occasionally two large impingers are used in series to increase collection efficiency.

The Casella cascade impactor permits collection of particles in four particle size groups. This device has not been widely used in this country for industrial hygiene studies, its application being more in air pollution work and in research on aerosols.

Dust collection devices which take an essentially instantaneous sample are the Bausch & Lomb dust counter and the Zeiss konimeter.

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With the Bausch & Lomb dust counter, a sample of air is first drawn into a humidifying chamber and then impinged against a glass plate by a hand-operated pump calibrated to a volume of 1/1000 cu. ft.

This sample can be brought into the field of vision of a microscope integral with the instrument for counting. The microscope provides a magnification of 200 diameters with dark field illumination. This permits counting particles smaller than those visible by the light field method for counting impinger samples. Consequently, the results of the two methods cannot be correlated for dusts of varying particle size distributions.

The instrument is useful for control purposes, but it should be kept in mind that the dust levels, as listed in the Threshold Limit Table of the American Conference of Governmental Industrial Hygienists, are based on the light field count of samples collected by the impinger.

The Zeiss konimeter impinges a sample of dust on a glass plate on release of a spring-actuated plunger. The glass plate can then be rotated to the field of vision of a microscope mounted on the instrument. The konimeter is widely used in South Africa and in Canada, particularly in mining operations, but has not found appreciable use in this country.

Automatic and Multiple Samplers. In response to a demand for a sampling kit which would permit the collection of a series of samples over an extended period, a number of automatic and multiple samplers have been developed.

The Gelman sequential sampler permits the collection of up to 12 air samples during selected periods and at designated intervals. For example, the sampler may be set to take a 20-minute air sample every two hours for 12 consecutive samples. The air flow can be adjusted over the range of 0 to 5 liters per minute which permits use of the unit with small impingers or with molecular filters.

The Aseco automatic impinger is designed to collect a series of up to 12 large size impinger samples during a 24-hour period. Sampling can be carried on for as much as 40 minutes of each hourly period.

With the increasing emphasis on the desirability of obtaining quantitative information concerning atmospheric conditions in an industrial atmosphere during the entire work day, these automatic sampling devices are coming into wider use. They have also proved of much value in air pollution investigations.

Electrostatic Precipitators. The electrostatic precipitator is applicable to the collection of dust and fume for which it is nearly 100 per cent efficient. The MSA unit operates on a line current of 110 a. c. The present model has a movable head which can be held in the vicinity of the exposure of the worker and through which air is sampled at the rate of 3 cfm. A meter permits keeping a check on the high voltage d. c. potential difference of 12 to 15 kilovolts between the ionizing electrode and the collecting tube.

Thermal Precipitators. The thermal precipitator is a device for collection of dusts and fumes with an efficiency of essentially 100 per cent for particles smaller than five microns in diameter. The principle of operation involves the passage of air through a chamber which contains one or two hot wires and a cool surface. As the air is slowly drawn through the chamber, particulate matter is repelled by the hot wire and attracted to the cooled surface. Microscope cover glasses are usually used as the cool surface, and the dust or fume particles are deposited on these in a thin ribbon.

The thermal precipitator has been used for collection of dust in connection with atmospheric pollution studies and in animal exposure chambers more than in industrial hygiene studies.

Of the units commercially available, the Casella thermal precipitator weighs about 16 lbs., operates on a battery and depends on a water aspirator for drawing air through the chamber. The rate of collection with this instrument is about 7 milliliters per minute, the rate of flow being regulated by a calibrated glass jet.

The Ficklen Konisampler weighs about 9 lbs., is operated at 110 volts a.c., drawing only 12 watts. A 6 or 12-volt storage battery can also be used for operating the Konisampler, or the unit can be plugged into an automobile cigarette lighter receptacle. Its sampling rate is adjustable up to 50 milliliters per minute. The sampling head is detachable and can be placed at a location remote from that of the other components of the instrument, which includes an automatic cutoff timer.

The Halco Thermopositor, using the thermal precipitator principle, samples air at as high a rate as 300 milliliters per minute. This unit uses 210 watts at a line voltage of 110 a.c. The unit weighs 18 lbs. and, to keep the glass slides sufficiently cool, water at room temperature is pumped through the unit at the rate of 2 gpm.

Filter Type Collectors. Commercially available filter media for collection of particulate matter is discussed in detail by Chambers,[2] who refers to the use of cellulose filter papers, spun glass fiber filters and to the cellulose ester filters commonly known as molecular, millipore, or membrane filters. These filters may be obtained with varying degrees of porosity. The more dense filters have greater efficiency of collection, particularly in the very fine particle sizes, but the more porous filters permit a higher air flow per unit area of filter. Techniques for the use of membrane filters in air sampling have been well discussed by First and Silverman[3] and by Paulus et al.[4]

It is usually good judgment to purchase commercial membrane filter holders, since these filters tend to be rather fragile and require a well designed holder for proper operation. Holders may be of the

—To page 101

IDEAS THAT WORKED

Devices and Ideas to Help Your Safety Program

By Arthur S. Kelly, Industrial Department, NSC

A Cabled Warning

The cable warning device so frequently used in gasoline service stations finds an excellent application at blind corners in plant yards. This idea is utilized at the Chicago works of Bethlehem Steel Company.

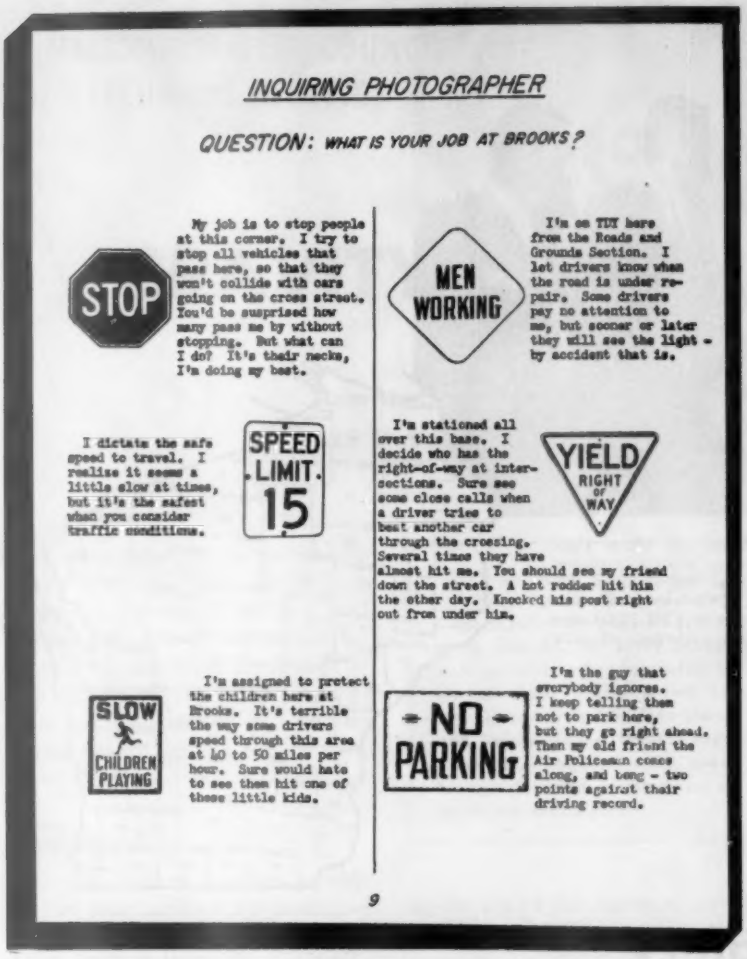
THE WINNERS

Six-month winner

U. S. Gypsum Co. in New Orleans won the six-month prize with their idea, "Do It with Mirrors." This was a modern twist given to an old safety stunt by personnel superintendent R. A. Koy. A mock television camera with a mirror inside was rotated through the plant.

January winner

Bethlehem Steel's idea, "Barring Accidents," was the winner for the month. They installed a switch that opens the bridge control circuit on a crane, preventing lateral movement. A person stepping into the cab must raise a bar that opens the switch.



INQUIRING PHOTOGRAPHER

QUESTION: WHAT IS YOUR JOB AT BROOKS?

STOP

My job is to stop people at this corner. I try to stop all vehicles that pass here, so that they won't collide with cars going on the cross street. You'd be surprised how many pass me by without stopping. But what can I do? It's their necks, I'm doing my best.

MEN WORKING

I'm on TDY here from the Roads and Grounds Section. I let drivers know when the road is under repair. Some drivers pay no attention to me, but sooner or later they will see the light - by accident it is.

I dictate the safe speed to travel. I realize it seems a little slow at times, but it's the safest when you consider traffic conditions.

SPEED LIMIT 15

I'm stationed all over this base. I decide who has the right-of-way at intersections. Sure see some close calls when a driver tries to beat another car through the crossing. Several times they have almost hit me. You should see my friend down the street. A hot rodder hit him the other day. Knocked his post right out from under him.

YIELD RIGHT OF WAY

SLOW CHILDREN PLAYING

I'm assigned to protect the children here at Brooks. It's terrible the way some drivers speed through this area at 40 to 50 miles per hour. Sure would hate to see them hit one of these little kids.

NO PARKING

I'm the guy that everybody ignores. I keep telling them not to park here, but they go right ahead. Then my old friend the Air Policeman comes along, and bang - two points against their driving record.

9

Signs of Life

Herbert W. Shockey, Tec. Sgt., USAF, Ground Safety Director at Brooks Air Force Base, Texas, has this to say about his idea: "Enclosed is a page from my GROUND SAFETY BULLETIN . . . I am running an "Inquiring Photographer" using objects such as street signs, machines, and personal protective equipment instead of people. The employees enjoy it, so they say, and it is a good way of giving them a painless safety message. I first used this idea at Kindley Air Force Base, Bermuda, about five years ago in the base newspaper. The people were so receptive to it that I am using it once again here at Brooks AFB."

Protecting Guests

We like the idea developed at the Wallingford Steel Company, Wallingford, Conn., for seeking the cooperation of visitors. We like it particularly because we think it's a much more intelligent approach to visitor safety than the old "waiver of responsibility" during plant visits which, so far as we can tell, had no legal status, at least so far as the family of the visitor is concerned.

A 3 x 5 card is handed to each visitor. The card, both sides of which are shown here, calls attention to rules and restricted areas. Eye protection is stressed. This idea was submitted by Charles A. Wooding, safety supervisor.

YOUR SAFETY is important to us. Please abide by all plant safety rules and keep away from all areas which are marked restricted.
SAFETY GLASSES must be worn while in our roll grinding department and machine shop.
YOUR GUIDE will aid you in completing your plant tour safely.
VISITOR BUTTONS AND SAFETY GLASSES
turned to the receptionist when you
We thank you for your
We do hope you
THINK SAFETY
SAFETY FIRST, QUALITY SECOND, PRODUCTION THIRD
ETERNAL VIGILANCE IS THE PRICE OF SAFETY
TAKEN FROM PRESIDENT EISENHOWER'S ADDRESS TO THE PRESIDENT'S CONFERENCE ON INDUSTRIAL SAFETY 1958
THE WALLINGFORD STEEL COMPANY
welcomes you as a visitor.
While you are viewing our operations, there are four important items to remember.
PLEASE READ THE OTHER SIDE OF THIS CARD.

SPOTTING on-the-job injury cases county by county are, left to right: James Busch, Department of Public Instruction; Les Mangin, president, Wisconsin Council of Safety; Prof. Robert Wernecke, University of Wisconsin Council of Engineering, and Dick Lutz, WCS vice-president in charge of occupational safety. The photo was taken by Cliff Hutchinson in the governor's office at the state capitol during a conference on occupational safety needs.

Wisconsin Sets

New Goals in Occupational Safety

By RICHARD D. LUTZ

WISCONSIN has done much to promote industrial safety and we're proud of it. But we're not satisfied that we have reached the point where our main goal is simply to preserve the status quo.

We know Wisconsin industrial accidents have been cut 33 per cent in 10 years, and workmen's compensation rates have been cut five times in six years. Yet, we're convinced that in an expanding business economy, our safety efforts also must be expanded, or we may suffer reverses in our fight against the accident menace.

RICHARD D. LUTZ is Vice-President of the Occupational Division, Wisconsin Council of Safety, and safety director, The Falk Corporation, Milwaukee, Wis.

Our State Industrial Commission (S.I.C.) reports Wisconsin had 22,852 injury cases settled under the Workmen's Compensation Act in 1957, a 7 per cent cut from the total in 1956. On-the-job deaths were reduced from 122 in 1956 to 111 in 1957.

Several months ago, at the invitation of the Wisconsin Council of Safety, Inc. (W.C.S.), state public officials, educators, insurance representatives, and industrial safety leaders met in Madison. Commissioner John Rouse, of the S.I.C., emphasized:

"My diagnosis of our needs shows we must give more help to the small employer, and we must make our statistical information more meaningful to more people. The small employer says he can't afford a full-time safety director; then we must persuade him that he should have part-time safety assistance.

"Our periodic statistics on job accidents cover a lot of ground, but I think they cover so much ground that many supervisors feel they don't want to wade through it.

"For their benefit, and for the benefit of a wider audience in business and industry in the state, I think it's time we did a better job of selectivity in what we present. What may interest an insurance company greatly may have little interest for a foreman responsible for a certain section of a plant's operations."

Les Mangin, of Manitowoc Shipbuilding, Inc., and W.C.S. president, urged closer ties between state and

—To page 110

A NATIONAL SAFETY COUNCIL TECHNICAL SERVICE

DATA SHEET D-473
(Revision of former D-416)

GRAVITY DROP HAMMERS

Published by National Safety Council
425 North Michigan Avenue, Chicago 11

1. Accidents involving gravity drop hammers have resulted in many permanent disabilities and deaths. This data sheet discusses the hazardous exposures presented by this equipment, the types of protection which should be provided by management, and the correct work procedures for hammer crews.

This Data Sheet is one of a series published by the National Safety Council, reflecting experience from many sources. Not every acceptable procedure is necessarily included. Data Sheets should not be confused with American Standard Safety Codes, federal laws, insurance requirements, state laws, rules and regulations, or municipal ordinances.

Equipment

2. Gravity drop hammers provide one of four methods for producing commercial forgings from hot-working steel. It has been estimated that nearly 50 per cent of the total tonnage of such forgings is produced by the drop forging method.

3. The two types of gravity drop hammers discussed here are the board drop hammer and the steam or air drop hammer. Both types shape the hot metal in closed impression dies. The intermittent impact pressure of the hammer blows shapes the forging through one or more forging stages to the shape required in the finished forging.

4. The forgings produced range in weight from less than one ounce to several pounds. They are made of all types of malleable metal—steel, brass, bronze, aluminum alloys, and magnesium alloys.

5. On the gravity drop hammer, the ram and the upper die are raised to the top of the hammer, and the force of the ram's free fall produces pressure on the fixed lower die. Drop hammers are designed so that alignment between the dies can be maintained by the use of guides, die pins, die locks, or a combination of these devices.

6. The board drop hammer, the more common type, utilizes hardwood boards which are fastened to the ram and held in it by means of wedges. These boards pass between rotating rolls which press against the boards and thereby raise the ram and the upper die for the successive hammer blows.

7. A steam or air gravity drop hammer is controlled by a valve which admits steam or air from under the piston into a cylinder in the head of the hammer to raise the ram and the die. Then the air or steam is exhausted and has nothing to do with the force of the forging impact. The force of the blow is controlled entirely by the weight of the free falling ram and the height to which it is raised.

8. Both board and steam or air drop hammers are operated by treadles or pedals.

Types of Injuries

9. Injuries which occur in the operation of gravity drop hammers and the agencies involved include the following:

a. Crushing or shearing of the fingers, hands, or forearms between dies, between the hammer and the anvil, or between the hammer and guide rails.
b. Injuries from projecting die keys.
c. Lacerations and bruises to the head, feet, or other parts of the body from flying pieces of broken die keys, hammer parts, or dies.
d. Injuries from flying splinters or from falling hammer boards or parts of hammer boards.
e. Burns from handling of hot metal or from flying flash or scale.
f. Crushing of the feet by dropped or falling objects.
g. Injuries to the hands because tongs are held incorrectly or because tongs and swabs with handles too short to keep the operator's hands out from between the dies are used.

Guarding

10. Although the degree of exposure to hazards may vary depending upon the size of the hammer and the size and shape of the particular part being forged, certain basic types of guarding should be provided for all gravity drop hammers.

Figure 1. An effective guard is installed on this board drop hammer to prevent damaged or detached boards from falling. Safety cables are attached to the spreader bolts, eccentric rod pin, drive motor, and board guard.

11. On cold restrike hammer operations, a hand lever, which is preferable to a treadle, can be installed. Also, a positive sweep guard, which moves from back to front and is actuated by the hammer ram, should be used.

12. On operations where the material is not held by the hands or by tools and where a sweep guard cannot be installed, a safety stop or tripping lever, or both, which will require the use of both hands to trip the hammer, should be provided.

13. A steam drop hammer or an air drop hammer should have a stop valve or quick opening and closing valve. Also, a safety head in the form of a steam or air cushion should be provided to prevent the piston from striking the top of its cylinder.

14. If a hammer has no self-draining arrangement, a drain cock, preferably the quick acting type, should be installed in the lower part of the cylinder at the back of the hammer. This cock should be arranged so that it can be opened without danger to anyone, or it should be piped to discharge at a safe place. Steam lines should be well trapped.

15. On every board drop hammer, a substantial guard should be provided around the boards above the rolls, to prevent the boards from falling if they should break or come loose from the ram (Figure 1). Some shops install permanent catwalks with handrails on the upper structure of the hammer, as shown in Figure 2, to facilitate lubrication and maintenance.

16. A strongly constructed guard should be provided at the back of each hammer to confine flying scale (Figure 3). This guard should allow ample clearance for the ram and easy access to the dies. It may be installed in one of the following ways:

a. Hinged on one side to an upright post so that the guard can be swung closed or open (out of position when access to the die area is required). This type of installation is considered the most efficient and is widely used throughout the forging industry.
b. Supported on a floor standard.
c. Suspended from the ceiling or from a rail, to which it is anchored.
d. Hinged to the frame of the hammer.

17. Treadles should have ample clearance and should be guarded to prevent accidental tripping by a falling object or by persons unfamiliar with the hammer's operation. Any portion of a treadle or pedal at the rear of the hammer also should be guarded so that scrap or other material cannot interfere with treadle action.

18. The flywheel or drive pulley should be enclosed by a guard

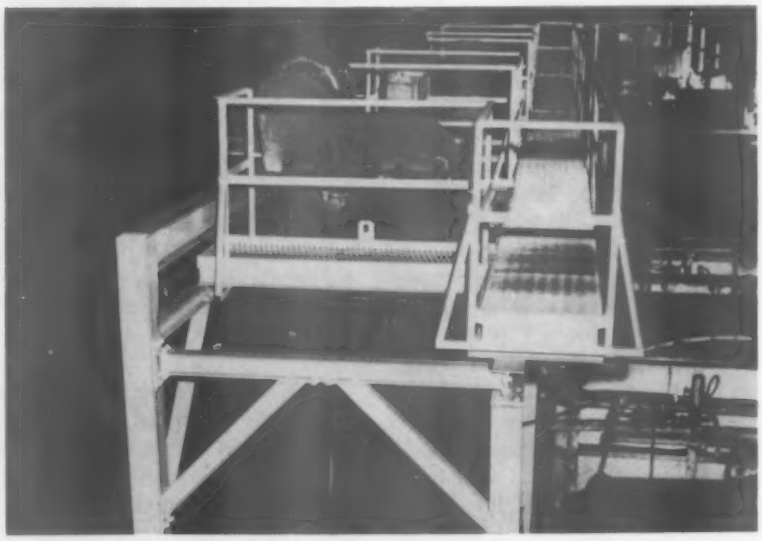


Figure 2. View of a permanent catwalk along the top of a row of board hammers. Such structures simplify maintenance and the changing of boards and promote safety in such operations.

strong enough to prevent the pulley from falling to the floor if the shaft should break. The strength and location of the guard bracket or the frame are more important safety factors than is the gauge of the sheet metal used for the enclosure. Brackets should be bolted to the column of the hammer. In some instances, the guard enclosure is supported from the floor by an I-beam.

19. All cylinder bolts, gland bolts, guide bolts and liners, and the head assembly over the operator's working position should be contained by cables or chains.

Die Keys

20. The steel used in die keys should be a medium carbon type which will not crack nor splinter. Both ends of the key should be tapered for clearance in driving and removing the key. Mushroomed keys should never be used.

21. Die keys should never project more than 2 inches in front of the ram and 4 inches in back, for safe operation and to facilitate driving and removing them.

Safety Props

22. Safety props equipped with handles at the middle should be provided and their use required when repairs or adjustments are to be made on the dies or when dies are to be changed. The prop should be held in place while the power is released to permit the weight of the upper die and the ram to rest on the prop.

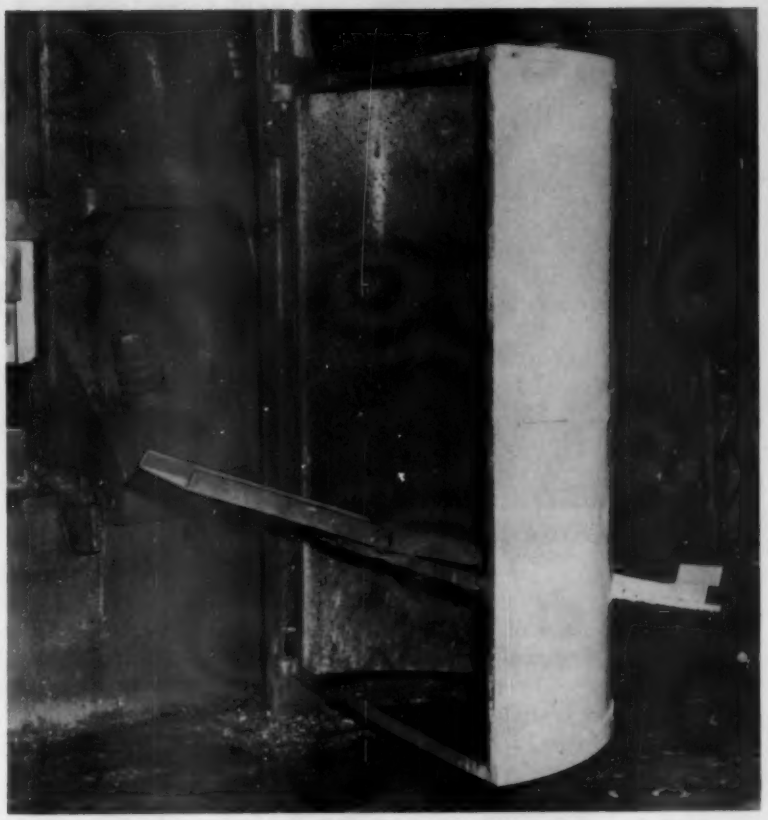


Figure 3. This swinging scale guard includes a forging chute hinged at its middle so the top half can be tipped upward to facilitate die setting and key driving.

23. Some companies chain the props to the hammers so that they cannot slip out of position. Other companies secure each prop to the side of its hammer by means of hinges so that the prop is readily available and easily moved into and out of blocking position.

24. The material most commonly used for a ram prop is a hardwood timber not less than 4 inches by 4 inches with a ferrule on each end. (See accompanying table).

25. A ram prop also may be made of a section of rail or of a structural shape, carefully squared on the ends, or of a section of steel tubing not less than 2½ inches in diameter (o.d.) with a wall thickness of ½ inch.

26. Another effective method of safely supporting the ram is shown in Figure 4. Keys or wedge-type blocks are inserted in slots cut in the gibs. The slots are cut to allow for a .0010 inch to .0015 inch sliding fit. The size of the keys varies in

DIMENSIONS AND STRENGTHS OF RAM PROPS

Size of Timber—inches (1)	Square in. in cross section	Minimum allowable crushing strength parallel to grain psi (2)	Maximum static load within short column range—pounds (3)	Safety factor	Maximum recommended weight of forging hammer for timber used—pounds	Maximum allowable length of timber—inches
4x4	16	5,000	80,000	10	8,000	44
6x6	36	5,000	180,000	10	18,000	66
8x8	64	5,000	320,000	10	32,000	88
10x10	100	5,000	500,000	10	50,000	100
12x12	144	5,000	720,000	10	72,000	132

(1) Actual dimension.

(2) Adapted from U. S. Department of Agriculture Technical Bulletin 479. Hardwoods recommended are those whose ultimate crushing strengths in compression parallel to grain are 5,000 psi or greater.

(3) Slenderness ratio formula for short columns is L/D = 11 where "L" = length of timber in inches, "D" = least dimension in inches. This ratio should not exceed 11.

Figure 4. This method for blocking the ram uses keys or wedge-type blocks inserted in slots cut in the gibs.

proportion to the size of the hammer. For a 4,000-pound hammer, each key is 2 inches by 1.5 inches in section. For a 30,000-pound hammer, each key is 2.5 inches by 1.75 inches in section. A stop bolt is secured to the rear of each key to prevent it from being pushed too far through the gib slot. The 24-inch handle is threaded into the key.

Tools

27. Pliers, specially designed tongs, and other suitable devices should be used for feeding the material so that the operator's hands need not be placed under the hammer at any time.

28. Tongs should be long enough that they can be held at the side instead of in front of the operator's body. It is important, also, that they fit the shape of the material being held for forging.

29. Oil swabs and scale brushes likewise should have long enough handles to make it unnecessary for the operator to place his hands or arms underneath the die.

Safe Operating Practices

30. The hammer man, who directs the activities of the men in the hammer crew, should be made responsible for their following safe work practices.

31. Since guards are provided for the protection of the hammer crew, they should always be in place when the hammer is in operation. They should be kept in good repair, and any defect should be reported to the foreman immediately upon discovery.

32. No material should be piled nor tools left in the aisles or in the operator's working space.

33. Before starting work, the hammer crew should make its own inspection to see that equipment and working conditions are in good order. If an unsafe condition is found, the foreman should be told about it at once.

34. Drop hammers should never be operated when the dies are cold. Dies should always be preheated by hot steel placed between them. Care must be taken when this material is removed since usually it is an odd shape for which suitable tongs may not be available.

35. In all cases, before work is begun on the dies, the machine, or the belts, the power should be turned off and locked out, the treadle should be blocked to prevent accidental tripping, and the ram should be propped.

36. When dies are being set on a board or steam or air gravity drop hammer, it is best to fit the dowel in the upper die and the ram with as few shims as possible. The bottom die, which should have enough shims so that it can be shifted easily, should be moved first.*

37. When the operator leaves the hammer, even if only for a few moments, the upper die should be left resting on the lower die, to prevent accidental tripping of the machine by a passer-by.

38. If air or steam is to be used to remove scale, a quick shutoff valve should be provided so that the pressure can be regulated. The operator should adjust the shield to protect other employees from flying scale.

Inspection and Housekeeping

39. Frequent periodic inspections should be made to ensure proper condition of all bolts, screws, keys, valves, and other parts which may be loosened by vibration.

40. Thorough, periodic inspection and adjustment should also be made of all parts of the treadle or pedal, clutch, and other operating mechanisms.

41. Wood ram props should be carefully checked at intervals. If a prop is defective, it should be destroyed and replaced by a sound one.

42. The floor around gravity drop hammers should be kept in good repair. The area around the hammer should be cleared of all

*This procedure is opposite that followed in setting dies in a double-acting steam drop hammer.

—*To page 52*

LOOK *for safeguards in industrial handcleaners*

SOOTHING LANOLIN

A rich lanolin content in West LAN-O-KLEEN Handcleaner combats the depletion of natural skin oils during washing. It has a retarding effect on the defatting action of soap. As determined by laboratory tests. And confirmed by years of industrial experience.

The lanolin in LAN-O-KLEEN is not milled into the soap by conventional methods. It is impregnated into a corn meal base by an exclusive process. In this way a higher content is achieved. But more important, the emollient is "free" lanolin. By being "free" its soothing and softening action is more positive and beneficial.

LAN-O-KLEEN offers still further advantages. Its corn meal base gently soaks up potential skin irritants with a soft, sponge-like action. A balanced combination of soaps provides high sudsing without excessive hand rubbing. Each pound bulks up to 50% more than most powdered soaps —and lowers costs with proportionately more washings.

FREE TRIAL OFFER. We'd be glad to supply a dispenser and five pounds of LAN-O-KLEEN for free trial. Or if you prefer, we'll send a sample for evaluation. Just call your nearby West office. Or mail the coupon below to our Long Island City headquarters, Dept. 3.

☐ Supply trial dispenser and 5 lbs. of LAN-O-KLEEN.

☐ Send a packet of LAN-O-KLEEN for evaluation.

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Circle Item No. 11—Reader Service Card

WIRE FROM WASHINGTON

By Harry N. Rosenfield **Washington Counsel, National Safety Council**

THE 86TH CONGRESS convened and was immediately confronted with various controversial organizational problems. Nevertheless, on the very first day of its session, many safety bills were introduced.

Industrial Safety. Among the earliest safety bills introduced were some relating to railroads. HR 229 (Price) would require the installation and maintenance of a communication system. A requirement that railroad cars be reflectorized or otherwise luminously equipped, so they can readily be seen at night, is the object of many bills: HR 340 (Coad), HR 1005 (Ford), HR 1008 (Gross), HR 1087 (Zelenko).

Three other bills, HR 829 (Lesinski), HR 861 (Multer), HR 902 (Polk), would require railroads to maintain tracks, bridges, roadbed, and permanent structures for the support of way, trackage and traffic in safe and suitable condition.

Amendment of the Federal Coal Mine Safety Act, to provide further for the prevention of coal mine accidents, was sought by HR 1098 (Bailey), HR 1153 (Morgan), HR 1371 (Van Zandt), and HR 1812 (Gray).

And HR 332 (Byrnes, Wis.) seeks to encourage the prevention of air and water pollution through tax write-offs for the cost of treatment works.

The U. S. Department of Labor is consulting interested parties in the process of developing proposed safety codes for the longshoring and ship-repairing industries under the terms of a bill enacted in the closing days of the 85th Congress. (See "Wire," September 1958.)

Under a ruling of the Atomic Energy Commission, issuance of a permit to construct a nuclear reactor does not guarantee the issuance of a license to operate it. A.E.C. granted a construction permit, with the clear understanding that it "is provisional upon further demonstration of many technological facts, including the complete safety of the reactor"; a grantee receives a construction permit "so as to develop a background that will support reasonable assurance that the reactor can be operated in complete safety."

The A.E.C.'s decision said: ". . . public safety is the first, last, and a permanent consideration in any decision" on a permit or license, and an operating license may be denied even where a holder of a construction permit has expended huge sums of money in building the reactor. The statutory standard of safety governing nuclear reactors requires "reasonable assurance of safety," not absolute assurance or a certainty that an accident will never occur.

The Bureau of Mines announced that the preliminary injury-frequency rate (fatal and non-fatal combined) for production and development workers in mineral-extractive industries was 23.35 in 1957, a decline of 6 per cent from 24.78 in 1956. The fatality rate for all mineral industry groups remained unchanged from 1957 as compared to 1956—0.44 per million man-hours. Non-fatal injuries declined 6 per cent, from 24.35 per million man-hours of exposure in 1956 to 22.92 in 1957.

The Interstate Commerce Commission issued notice of its intention to amend its Motor Carrier Safety Regulations in several respects: to permit a driver subject to hours of service regulations to continue working where, because of weather conditions, failure to continue to drive would imperil his own safety

—To page 90

THE MONTH IN WASHINGTON

- Four new railroad safety bills seek reflectorized, luminously equipped railroad cars for better nighttime visibility.
- Four bills introduced to amend Federal Coal Mine Safety Act.
- Atomic Energy Commission now can allow construction of nuclear reactor but can withhold operating license, if reactor found unsafe.
- New traffic safety bills involve vehicle equipment, research grants, driver training, exhaust pollution, registration, uniform laws.
- CAB proposes changes in its requirements on performance, flying qualities, power plants, cockpit controls, fuel shutoff provisions.

Seems like most everyone wants a pair!

for both work and play

No. 624
A 8-13
B 7-13
C 6-13
D 6-13
E 6-13
EEE 6-13

NEW Iron Age Ripple® Sole

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SAFETY OXFORDS

Note the deep, lateral grooves in these Ripple soled safety shoes. They absorb shock, add spring to the step, conserve energy. And the multiple, non-skid Vee's contribute to safety by gripping wet, slippery surfaces.

COMPANION STYLE—No. 626
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Nothing in decades has so captured the public's imagination as "floating foot" Ripple Soles. Now Iron Age makes it possible for your employees to satisfy their wants with this distinctive new Iron Age safety shoe, and get double duty wear, both at work and at play.

This dressy brown Iron Age safety oxford is as eye-appealing as it is comfortable. There's no better way to increase your coverage. Just stock and display Iron Age No. 624—the Ripple Sole safety oxford with the custom-crafted look and wearability to match. Let us have your stock order today.

Iron Age DIVISION Iron Age **H. CHILDS & CO., INC.**
Pittsburgh 12, Pa.

Circle Item No. 12—Reader Service Card

TV Eyes Watch Atoms

—From page 19

one major difficulty. According to William M. Thompson, who designed the television system to fit the master-slave robot, this obstacle must be overcome before three-dimensional television can be applied where manipulators must handle delicate parts.

The difficulty is that no two presently available television cameras always see the same object the same way. There is always a little distortion, often enough to throw off a pair of perfectly matched images required for satisfactory three-dimensional viewing.

When completely perfected, three-dimensional television should allow the nuclear scientist to:

1. Perform delicate experiments safely with highly radioactive materials without having to be near an area where experiments are being conducted.

2. View closely and safely a small portion of a large area contaminated with radioactivity.

3. Use extreme distances—rather than heavy and expensive walls of lead and concrete—as shielding against radioactivty.

Possible applications of a slave robot with 3-D television eyes are almost beyond the realm of science fiction. Such a robot might explore the area of an atomic bomb-drop immediately after the explosion. A robot might allow an earth-bound scientist to explore the moon and make chemical analyses of the materials comprising its surface.

Two-dimensional television at Argonne's EBWR is now being used:

1. To quickly show the water level in the reactor pressure vessel in the same way that an engineer checks the water level of a conventional steam boiler by looking at a glass tube leading directly from the boiler.

2. To enable the reactor operator to see pressure and water level gauges attached directly to the reactor vessel without leaving his control room several hundred feet away.

3. To provide an accurate check of electronic pressure and water level indicators in the control room.

4. To provide measurements without exposing reactor operators to radioactivity that may be present while the reactor is operating.

5. To check settings of steam valves and other test equipment in the camera's view. (The camera mounted in EBWR can be remotely tilted or rotated about a 360-degree arc.)

6. To show conditions in an area adjoining the reactor pressure vessel, if the area became contaminated with radioactivity, making direct inspection unsafe.

Circle Item No. 13—Reader Service Card

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Circle Item No. 14—Reader Service Card

For EBWR observation Argonne uses a Dage closed-circuit industrial television camera with a 15-in. monitor and controls in the reactor control room. This system has operated satisfactorily since EBWR was completed late in 1956, according to Walter C. Lipinski of the Argonne Reactor Engineering Division who helped design the closed-circuit setup.

Before building EBWR, Argonne tried out closed-circuit television on its Borax-II experimental power reactor at the National Reactor Testing Station near Idaho Falls, Idaho. Borax-II, forerunner of Borax-III, first produced enough electricity from atomic power to light a town on July 17, 1955, after having been built at an isolated site on the central Idaho prairie.

Many of the controls for Borax-II were built into a house trailer located for safe operation half a mile from the reactor building. A closed-circuit television system monitored the water level in the Borax-II pressure vessel in the same way closed-circuit TV now watches EBWR's pressure vessel.

Closed-circuit television also will play an important part in the control system of Experimental Breeder Reactor II, (EBR-II), now being built by Argonne in Idaho. EBR-II will begin generating electrical power from the atom in 1960, demonstrating the process by which plutonium can be "bred" or produced from that part of uranium normally not useful as a nuclear fuel. This new reactor will have a high-resolution, closed-circuit TV system with many new features to make its application flexible.

Thomas R. Spalding of Argonne's Reactor Engineering Division, who has been working on the EBR-II installation, has outlined these new features:

1. Better picture quality, resulting from video signal output of the camera viewing tube rather than from modulated radio frequency signal output.

2. Two receivers—a 17-in. monitor in the control room of EBR-II, and a 10-in. receiver in the boiler plant.

3. Complete remote operation from the control room, with remotely-operated pan and tilt of the camera, as in EBWR, plus a remotely-operated lens turret with a 2-in. lens for normal viewing, and a 3-in. lens for remote viewing.

A little girl was telling of her hospital experience in having her appendix out: "They told me it wouldn't hurt, then they stuck a needle in my arm and I disappeared."

Highway cop to speeder: "Of course you didn't hear my siren! You had already passed through the sound barrier."

HOW FOUNDRY SAVES $90 PER MAN WITH Riegel

Special-Purpose Gloves

Here's on-the-job proof! No matter how special your needs are, Riegel has the *right* glove. This large midwest foundry switched from leather-palm gloves to Riegel's specialized Hot Press gloves for handling hot castings. They paid 15% more per pair, but got 87% more wear! $90 saved every year for every man!

The men prefer Riegel's added roominess and the thick, wool-content lining that gives better heat protection and longer wear. Riegel's wing thumb adds flexibility.

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Circle Item No. 16—Reader Service Card →

In roaring steel mills . . . in vital oil fields throughout the world . . . at throbbing power plants large and small . . . behind the guarded gates of highly-secret atomic installations and missile centers—wherever complete fire protection is important, you'll find Ansul. • Industry knows that only Ansul digs deep into basic fire research, that Ansul can be depended on for the best answers to fire protection problems. • More than 20 years ago Ansul began this search for new and better ways to prevent fire loss. Ansul pioneering continues today with the introduction of new, improved fire fighting equipment and advanced training techniques. • Put this knowledge and ability to work to help you build the complete fire protection program that could someday save your plant from destruction. • Start with Ansul people. Draw on their technical skills, their practical experience to solve the fire protection problems you have. ANSUL CHEMICAL COMPANY, MARINETTE, WISCONSIN.

new products, new ideas for better fire protection

ANSUL

REFRIGERATION PRODUCTS
FIRE FIGHTING EQUIPMENT
INDUSTRIAL CHEMICALS

Machining Beryllium

—From page 29

donning personal clothing. Lockers are provided for storage of personal effects during working hours.

The effectiveness of the exhaust system has been such that the use of respiratory equipment is limited to new processes, handling of powders, and decontamination work. A super microtoxisol twin-cartridge type respirator is generally used. Two airline respirators are also on hand for decontamination efforts after an accidental spill of the powdered beryllium. Decontamination is conducted under the supervision of a representative of the safety section.

Employee Education. Employees' cooperation and respect for the material has been the key to successful operation. Worker attitude was one of the major problems that arose when the beryllium machining program started. Through misinterpretation of statements regarding toxicity, some of our personnel developed fears which had to be allayed through education. A series of open discussion meetings between workers, industrial hygienists, and safety and medical personnel were held to review every phase of the program.

The most apparent improvement in employee morale followed a series of interviews, in which the experimental machinists were told that only the best in our employ would be permitted to work on beryllium. None of the employees objected to his job assignment following these meetings. The records of air sampling results are posted in the area, and employees are continually encouraged to question any phase of the program that concerns health and safety. Morale in the group has continued to be exceptionally good.

At the start of the program the area was referred to as a *special machining area,* dropping any reference to beryllium. This proved wise, as the same technicians are required to machine other toxic materials with same basic precautions observed.

Medical Program. All personnel assigned to the machining area are given thorough physical examinations, including a chest x-ray and an interview regarding family history. No one with any indication of possible respiratory conditions is placed in the program. Follow-up examinations are conducted every six months for as long as the individual is assigned to the beryllium work with annual physicals after the person leaves beryllium work.

Weekly weight and vital lung capacity check-ups are also conducted on the active personnel. A 10 per cent weight or lung capacity loss is investigated to determine

Here is instant, effective first aid against dangerous eye splash and body contamination...

SPEAKMAN® "safety-zone" combination eye wash and emergency shower S-2087

This Speakman "Safety-Zone" unit is a first aid safety factor designed especially for use in refineries, laboratories, chemical plants and other installations where personnel are exposed to possible injury from chemical splash, clothes fire, caustics, acids, fumes, etc.

The Emergency Shower, which provides a heavy drenching shower, is complete with bottom sprays and is platform operated. Aerated Eye Wash Fixture operates independently of the shower, and is equipped with special hose and spray for administering relief to prone victims.

Emergency Showers and Aerated Eye Wash Fixtures are available separately in various sizes and models to meet your specific requirements. For complete details, write Dept. N-2 for Speakman Safety Booklet S-88-B.

SPEAKMAN COMPANY

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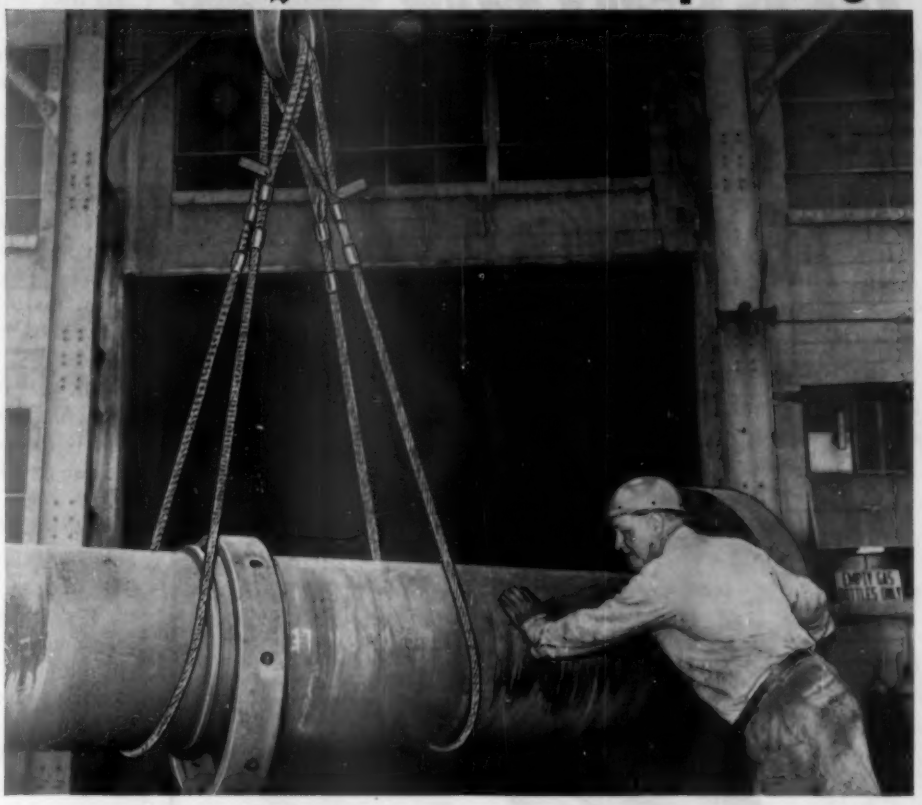
ACCO Registered® Wire Rope Slings



Lifting a finished part calls for safe, proved slings!

• Certainly, you didn't use inferior machine tools, material or labor to produce that finished part! Then, don't risk the chance of it suddenly becoming scrap loss due to the failure of a homemade, unproved sling! Too often, riggers are called upon to perform all-important lifts with makeshift slings of questionable quality—a "false economy" that can prove to be both costly and dangerous. Your rigger is a skilled employee—deserving of the same high quality tools to do his job as any other skilled workman.

To make certain that your rigger has the right tools to lift any load with a full margin of safety, see that he is equipped with the only sling made with the same painstaking accuracy as a precision-made tool—ACCO *Registered* Wire Rope Slings. Each ACCO *Registered* sling is factory proof-tested at twice its rated load carrying capacity. Only then does it receive an ACCO tag and registration certificate.

In addition, only these slings give you the assurance of DUALOC endings...the double-locked mechanical ending which guarantees full wire rope strength with either thimble or plain loop.

Don't delay...call your nearest ACCO distributor today and let him work out the details of how to give your production line "registered" protection with ACCO *Registered* wire rope slings.

Free Sling Information • Write our Wilkes-Barre office for your copy of new **Folder DH-532,** which gives strengths and weights (for six different lifts) on a full size range of ACCO *Registered* Cable-Laid Slings.

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1. The best material
2. Unit safety factor (on bodies, rings, links, hooks)
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4. Actual field service test of each design
5. Metal identification tag on each sling
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In Canada: Dominion Chain Company, Ltd., Niagara Falls, Ontario

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THE ORIGINAL ALLOY STEEL CHAIN

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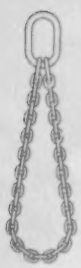
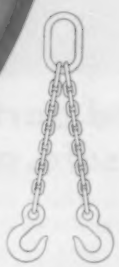
● Herc-Alloy is sold in running lengths and in all types and sizes of sling chains assembled to customers' specifications.



● CM also produces a complete line of chain attachments and welded chain of all types including stainless steel and bronze.



● Write for literature covering Herc-Alloy Sling Chains, including helpful information on their assembly, care, use and inspection.

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Circle Item No. 19—Reader Service Card

cause. The findings so far have been that the individual has been suffering from a cold or other minor ailment.

Minor cuts and scratches are treated immediately, with no particular difficulties resulting. As an additional precaution, all outside contractor personnel are examined prior and after exposure to the area. On one occasion an existing lung condition was discovered, of which the individual was unaware, preventing possible company involvement in a liability case. This also served to place the individual in the care of his own family physician for further medical follow-up.

Up to the present, there is no reason to believe that any employees have been adversely affected in work with beryllium or beryllium alloys.

Conclusion. Beryllium, vital to the national security, is toxic when air-borne particles are generated through machining. Avco has machined tons of beryllium with no adverse effects, proving that with proper precautions safe production is possible. A safety program should monitor and control contamination, provide medical and educational programs, and initiate an adequate waste disposal program.

REFERENCES

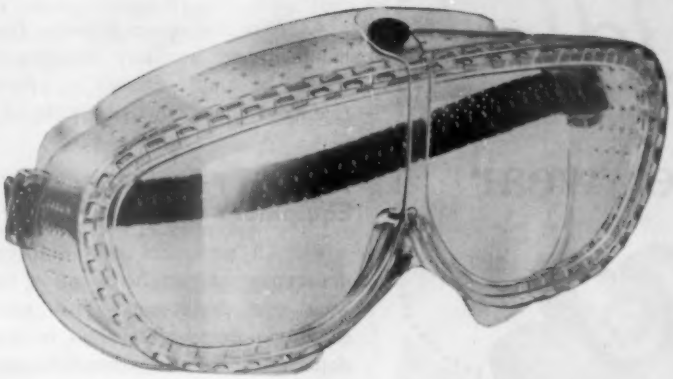
1. AEC Issues Recommendations for Control of Beryllium Hazards, Anonymous, *Safety and Fire Protection Newsletter* (AEC 1 May 1950.)

2. Massachusetts Dept. of Labor and Industries, Division of Occupational Hygiene, *Bulletin 683*, October 1955.

3. American Industrial Hygiene Association, *Hygienic Guide, Beryllium and Compounds*, September 1956.

Our fundamental purpose in education is the creation of rich many-sided personalities equipped with practical knowledge and inspired by ideas so that they can make their way and fulfill their mission in a changing society which is a part of a world complex—*Charles Beard.*

two popular



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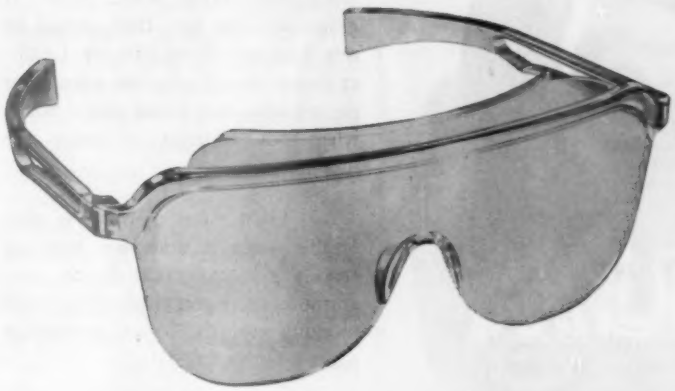

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More coating here . . .
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IN ITS 25TH ANNIVERSARY LINE Edmont, originator of coated gloves for industry, offers you Extracoat, a controlled application of extra coating on areas of greatest glove wear. On areas less subject to wear, a normal coating is applied.

Wear tests show that Extracoat lengthens glove life by at least 20%. It increases the 40% to 70% cost savings previously afforded by Edmont job-fitted gloves.

► **FREE TEST OFFER TO LISTED FIRMS:** Describe your operation, material handled, temperature condition. From more than 50 types we will recommend the glove that best fits your job and supply samples for on-the-job testing.

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25th ANNIVERSARY LINE
Edmont

Edmont JOB-FITTED GLOVES

Circle Item No. 21—Reader Service Card

Data Sheet

—From page 40

equipment and material before repair of the machine or changing of dies is undertaken.

43. Working space between the hammer and auxiliary equipment should be ample enough to allow free movement of men and material.

Personal Protective Equipment

44. All personnel in the forge department should be required to wear eye protection. (This rule should apply to all visitors in the department, too.) Sweatbands should be worn by operators, heaters, and helpers.

45. Leather leggings and leather aprons (to prevent burns) and hard hats should be worn by all persons working in hammer crews.

46. Crew men should be provided with cotton fabric gloves. If gloves become wet, they should be removed and allowed to dry. Leather gloves should never be worn since perspiration may cause steam burns when hot material or tongs are handled.

47. Light wool clothing is preferable since it does not burn so readily as cotton and absorbs perspiration more effectively. Also, wool clothing affords better protection against burns.

48. Safety shoes should be worn by all employees. Oxfords should never be worn on forge operations.

ACKNOWLEDGMENT

This data sheet, originally prepared by the Industrial Department of the National Safety Council, was revised by William H. Berry, Superintendent, Forge Division, Tractor Works, International Harvester Company. Mr. Berry is co-chairman of the Engineering and Technical Publications Committee of the Power Press and Forging Section of the Council. The revision has been extensively reviewed by members of the National Safety Council, and representatives of chapters of the American Society of Safety Engineers. It has been approved for publication by the Publications Committee of the Industrial Conference of the National Safety Council.

Labor and Management

—From page 27

Six consecutive Awards of Honor from the National Safety Council and a Sentinels of Safety trophy (to Calloway-Mary Mine for its 1957 record) have highlighted safety activities.

This number of awards is considered a measure of the effectiveness of the labor-management safety committee. Says Manager R. R. Burns, "The committee has done an excellent job in promoting enthusiasm in safety."

At its annual dinner meeting in August 1958, committee members and guests displayed numerous awards received for safe work during 1957. Guests included superintendents or assistants, who accepted recognition for their respective departments. Also invited were the five presidents of local unions.

Awards presented included 26 Joseph A. Holmes Safety Association Certificates of Honor, an Award of Honor, an Award of Merit to the Acid and Chemical Engineering Departments, Lammot du Pont Award, Sentinels of Safety trophy, and President's Award to the lead burner crew for three million manhours of exposure during 31 years of operation without a disabling injury.

Following the presentations, T. A. Mitchell, TCC president and general manager, expressed the goal of the committee. "We should be proud to get a pat on the back," he said, "but the real thing is to prevent someone from getting injured."

The committee's contribution to the safety program is perhaps best summed up by a committee member. After hearing a discussion of fire prevention at a recent meeting, J. L. McHan, representing the Boyd Mine crew, said: "I have plenty to take into the crew safety meeting now."

A good deal of the room at the top is made by men who have gone to sleep there and have fallen off.

PATENTED
MULTI-FIT
BRIDGE
Only Fendall safety glasses are equipped with the revolutionary Multi-Fit bridge, already proved one of the greatest advancements in safety spectacle history. Safety directors all over the nation are standardizing on Fendall safety glasses with the amazing Multi-Fit bridge. Now is the time to improve your eye-safety program. Equip your workers with Fendall safety glasses now. Write for details.
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- ■—simple to apply
- ■—always ready to use—DRY
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With UREABOR, you get the features you want in a weed killer. Standard package is 50-lb. multi-wall paper sack; easily handled. A special spreader is available for delivering the low rates of UREABOR over large areas. Write for full information about UREABOR weed and grass killer.

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Circle Item No. 23—Reader Service Card

Safety Equipment

—From page 23

So why not include protection for the human body. It cannot be replaced from stockpile or restored with spare parts?

Many veteran safety men favor the idea. They base their opinion on the fact that safety has gone a long way on a voluntary basis, that employers issue a large amount of personal protection at cost and vast quantities free to their employees. Safety men generally realize that industry does not get full use or value from its safety equipment.

Our employment of about 7,000 persons covers all phases of the industry from ore piles to pig iron and steel. Our management and safety committees are constantly on the alert to improve existing conditions, to provide better guarding, illumination, ventilation, housekeeping, and other elements that make up a safe plant. We are proud of a well-equipped plant guarded according to exacting standards.

Before outlining our personal protection program, I want to confirm other opinions that 80 per cent or more of industrial injuries are not associated with the machines or tooling of our plants.

Personal protection provided *free* includes:

1. Standard eye protection, such as glasses and face shields.
2. Flameproofed garments.
3. Spats.
4. Safety belts.
5. Headguards and liners.
6. Welding helmets.
7. Special types of gloves.
8. Respirators.
9. Miscellaneous devices, such as personal safety tags for maintenance.

Equipment provided at cost:

1. Any type of steel-toe footwear.
2. Work gloves.
3. Prescription safety glasses at a nominal part of the total cost.
4. Welders' aprons at half price.

It is our sincere desire to get our men to realize what is available *and to use it.*

Diary

—From page 31

not yet paid for, and a pittance to live on.

It happens that I know well one of the plant safety engineers in the corporation, so I called him. He told me that Deleter's report had been accurate enough, except that it wasn't jealousy that led to the rebellion of the plant men.

"Look, he wouldn't back us up. Carter was the plant man where those occupational disease cases came up. The union had hollered first, and Carter investigated and found the charges were sound. He told Deleter, but Deleter wouldn't go to bat with the production people.

"And those fires—one was in a plant where we had one of Deleter's pets, a windbag like Deleter. Honestly, he let things get so bad that the fire insurance boys seriously considered the possibility of arson.

"The other fire happened in a plant two days after Deleter had made a visit personally and seen nothing wrong. On top of that, he wouln't go to bat on salaries for the plant men, and he literally couldn't even talk intelligibly about engineering."

What can you do in this kind of a case? Maybe somebody needs a good propagandist. But who wants to risk disturbance of departmental relations by hiring as a junior a guy used to holding a big job and used to throwing his weight around with his underlings? Yet, he is a good man, in his own limited area of competence.

I'll write to a couple of the bigger outfits that might be able to use a specialist.

I turned from the unhappiness and uncertainty of human relations to the clean, crisp, positive beauty of the half-drawn design for a complicated machine guard, where a T square lays a precise line across clean paper, and where even a mistake can be erased with a painless stroke of an eraser.

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Circle Item No. 24—Reader Service Card

Sanitation

—From page 25

through elaborate laboratory and research facilities and competent personnel, is not a substitute for sanitation. A frequent and serious mistake in trying to set up a sanitation function is to place its supervisory personnel under a laboratory director and make it subordinate to the quality control function.

In such a situation, the laboratory cannot help insulating the sanitation personnel from effective contact with management. There are, of course, large areas of cooperation between laboratory and sanitation functions.

Another way to handicap sanitation is to place its management in a position subordinate to either production or mechanical maintenance management. This automatically restricts it to a narrower range of work and prevents the exercise of its police and inspection functions. A subordinate cannot police his superior, but sanitation organized on a level with other plant functions and directly representing the plant manager is in a better position to influence the operations of parallel departments.

Inspections by outside agencies, such as health, food quality, labor, safety, fire, building, and others, are never effective unless their interests are represented inside the plant by organized sanitation.

Integration of industrial sanitation means the establishment of the clearly differentiated and supervised function in a manner so solidly useful to operation that management and production supervision cannot do without it. If sanitation is integrated, it cannot be cut out without a process of disintegration that leads to confusion, waste, and loss.

When economic pressures for cutting expenses come, as they do from time to time, the unintegrated parts of plant maintenance first suffer. Casual maintenance labor and duties may be lopped off without full recognition of the consequences, while integrated sanitation should be so firmly established and so stoutly defended as an essential that it will not have to bear more than its share of the over-all cuts.

The Nabisco Pattern

I should like to make specific reference to what might be called the Nabisco pattern for industrial sanitation. Just 14 years ago executives of National Biscuit Company came to the conclusion that there was something fundamentally wrong with the handling of plant sanitation. Everybody in general and nobody in particular was responsible for it. They reached the radical decision that someone with some apparent qualifications in the field of environmental sanitation should be employed to develop a company-wide program, with a position and authority appropriate to this objective.

The essence of the Nabisco pat-

or is it?

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But unsupervised, he may nap or skip rounds. That's why many plants require that each watchman carries a tape recording DETEX Guardsman Watchclock. Through lonely nights, long weekends, and extended plant closings, the Guardsman gives you a tamper-proof, minute-by-minute record of his activities. Knowing this, he isn't very likely to sleep, shirk or skip rounds.

The Guardsman quickly pays for itself by saving on overtime. It's unnecessary for a supervisor to return on Saturday and Sunday just to change a 24-hour dial. Write today for complete information.

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Circle Item No. 25—Reader Service Card

tern, as it has developed through the years, might be summarized:

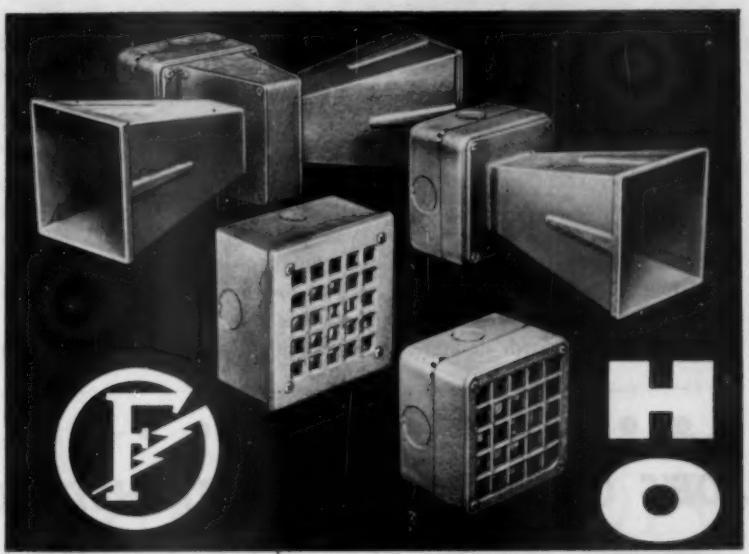
1. An administrator directly responsible to the president and executive vice-president and receiving their wholehearted support.
2. A sanitation department in the general office on a level with other departments and in a position to deal with all operating units, whether purchasing, production, or sales.
3. A sanitation department in each manufacturing unit on a level with other plant departments, and with sanitation supervision directly responsible to the plant manager.
4. Separation of maintenance of plant work environment from production and mechanical maintenance functions and the integration of sanitation tasks into other plant activities so as to give a balance of essential support and service.
5. Exercise of surveillance over company-wide operations and within each plant to obtain reasonable conformance to a high but practicable level of sanitation.
6. Participation in plant and machine design and in selection of sanitation supplies and equipment.
7. Systematic recording of the use of sanitation labor on the basis of a standard pattern of tasks, and comparative evaluation of sanitation performance and efficiency in groups of like plants.

The plan seems to be logical and productive of desired results. It is not a side line, a dispensable activity, but an integrated, essential part of the company in all its operations. However, this pattern is still undergoing refinement and more complete application. Perfection is not yet in sight.

Admittedly, a large, multiple-plant operation has many advantages in administering such a program, especially in the employment of a person or group able to provide both staff and line services. Competition between plants and the contributions of supervision in the many plants to the solution of common and special problems help in the development of the over-all program, aided by periodic conferences of sanitation supervision and coordinated by the general office staff.

Consultants essential. In smaller companies and in single-plant operation, it may be highly desirable to obtain some of these benefits through employment of sanitation consultants. Too often, the lone and inexperienced individual assigned the responsibility is unsure of his ability and his technical knowledge. He feels unable to defend his position against the pressures of other departments and the impatience of his superiors.

The independent consultant can give guidance in the general objectives of such an undertaking and direct support to the plant sanitarian in the details of his work. The consultant also has the major function of periodically inspecting and evaluating the status of plant sanitation. This service is usually necessary to maintain management's interest in the program until it is well established and to help the sanitarian to move forward in handling his job.



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Its a **new** modular design. Add a couple of simple accessories for flush mounting, or select others to convert it to a projector type. Various wiring devices permit semi-flush, surface, concealed conduit or weatherproof installations.

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THE SAFETY LIBRARY

Books, pamphlets and periodical articles of interest to safety men . . . Compiled by the Library, National Safety Council

The Plant's Setting

Grounds Maintenance Handbook. By H. S. Conover. Published by F. W. Dodge Corp., 119 W. 40th St., New York. 1958. 500 pp., index. Price $10.75.

INDUSTRY is moving out into the countryside. Factories which look like schools are springing up along the highways. And these handsome modern buildings are set in beautifully landscaped surroundings. To maintain these grounds requires more than a handyman with a green thumb. It takes a crew of trained men with mechanized equipment and modern fertilizers, insecticides, and weed killers.

In addition to the chapters on trees, shrubs, and flowers, there is much practical information on maintenance of roads and parking areas. Parks and highways personnel, as well as those in charge of the maintenance of industrial and commercial properties, will find this book helpful. The home gardener would also find it of practical interest, although he would probably find a less expensive book adequate for his needs.

—CARMAN FISH

How to Think Creatively

Creative Thinking. Whiting Reinhold Publishing Corp., New York City. 168 pp. $3.95.

THE TEXT deals with the problem of developing the creative abilities of individuals and groups. Of course, no treatise on this subject would be complete without mentioning *brainstorming.*

The book explains creative thinking in clear, simple language. Having established the basic principles and techniques, the text covers a number of operational techniques. These are systems, procedures, or methods designed to enable an individual or group to produce a large quantity of original ideas.

As stressed in the book, each operational technique is based on two simple rules: all judgment or evaluation is eliminated from the idea-producing stage; and all ideas, even the most impractical, are considered.

Operational techniques described

—*To page 112*

JOE'S COMPANY HAS SWITCHED TO VYTHENE*!

Joe's company has switched to VYTHENE—a *Stabilized* 1,1,1-Trichloroethane. Up go morale and efficiency. Down goes the accident rate. VYTHENE's low toxicity is approx. 1/20th that of Carbon Tet, approx. 1/5th that of Trichloroethylene. Versatile VYTHENE has *now been stabilized for solvent vapor degreasing, too*. Joe's firm is getting *a premium safety solvent without the premium price tag.*

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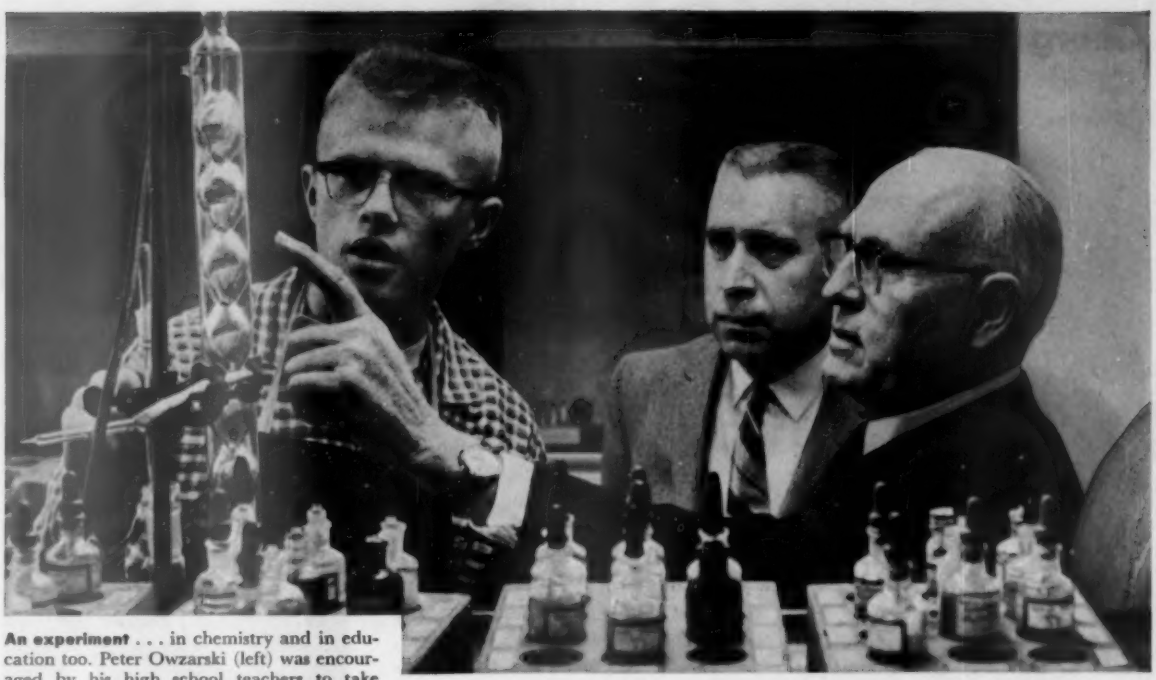

An experiment . . . in chemistry and in education too. Peter Owzarski (left) was encouraged by his high school teachers to take college courses in chemistry after they found his interest in this field had prepared him for advanced work. Now he attends his high school in the morning, college in the afternoon. Peter is enrolled in chemistry courses on the Wausau campus of University of Wisconsin's Extension Division. Dr. Samuel Weiner (center) guides this brilliant young man in his advanced courses.

Thomas Alva Edison's motto is used to measure a community's aims and achievements

Wausau Story

by **MAX McGRAW,** *President of McGraw-Edison Company*
Vice President of The Thomas Alva Edison Foundation, Inc.

The Science Fair at Wausau Senior High School was an impressive part of my visit. On their own time, some 900 or more boys and girls had prepared 700 scientific exhibits. The projects covered everything from nutrition to seismographs . . . even a walking-talking mechanical man made out of stove pipes and tin cans. Beverly Geske tells me this is the school's fourth annual fair under the direction of Mr. Ben Berg.

"You've heard Mr. Edison's motto: 'There's a way to do it better—*find it.*' Those words have always meant a lot to me, yet I know they are not easy to follow.

"I found that out when I was a boy. I got fourteen of my friends to join me in setting up a telegraph circuit between our homes. We had to string up eight miles of wire. Then we had to learn the Morse Code.

"It was worthwhile though. When you're in pursuit of a better way, the reward is in the challenge as well as the achievement. When I was in Wausau recently, I felt the community was aware of this. I visited schools. I talked to business men and found the same spirit. Many of you know this. You've done business with Employers Mutuals of Wausau. They're known as 'good people to do business with'. Their aims and achievements prove they deserve this reputation."

Employers Mutuals thanks Mr. McGraw for visiting us in Wausau. Employers Mutuals, with offices all across the country, writes all forms of fire, group and casualty insurance (including automobile). We are one of the largest in the field of workmen's compensation. Our business is growing and we need more people to help us—especially in our sales department. If you are interested in career opportunities with Employers Mutuals' nation-wide organization, write to C. E. Smith, Sales Manager, Employers Mutuals of Wausau in Wausau, Wisconsin.

Employers Mutuals *of* Wausau

"Good people to do business with"

George Burns Retires From Council Staff

George E. Burns

Rounding out a career of 40 years in the field of accident prevention, GEORGE E. BURNS, manager of the Council's Office Services Department, retired from the Council staff on January 1.

Mr. Burns is well-known among safety men for his work as general manager of the annual National Safety Congress and Exposition. He has handled the over-all administration of the Congress—one of the nation's largest annual conventions—for more than 20 years.

Mr. Burns' career in safety began in 1918, when he went to work for Aetna Insurance Company in the relatively new field of accident prevention. He had attracted the interest of Aetna through his designs of machine guards for the Kohler Die and Stamping Company. Two years later he moved to Liberty Mutual Insurance Company, where his work with safety films brought him in contact with the National Safety Council. In 1925, W. Dean Keefer, then the Council's chief engineer, and William H. Cameron, managing director, persuaded him to join the Council's staff as an engineer in the Industrial Department.

PAUL H. STAEDKE, who joined the Council's accounting department July 1, 1929, succeeds Mr. Burns as manager of the Office Services Department. As the accounting department was expanding to meet the needs of a growing Council, Mr. Staedke served in several capacities, most recently in the installation and operation of a cost system.

Paul H. Staedke

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StaSafe Acidmaster

Rear of StaSafe Emergency Suit showing air line and life line.

Front view of Emergency Suit model designed for Scottoramic face piece.

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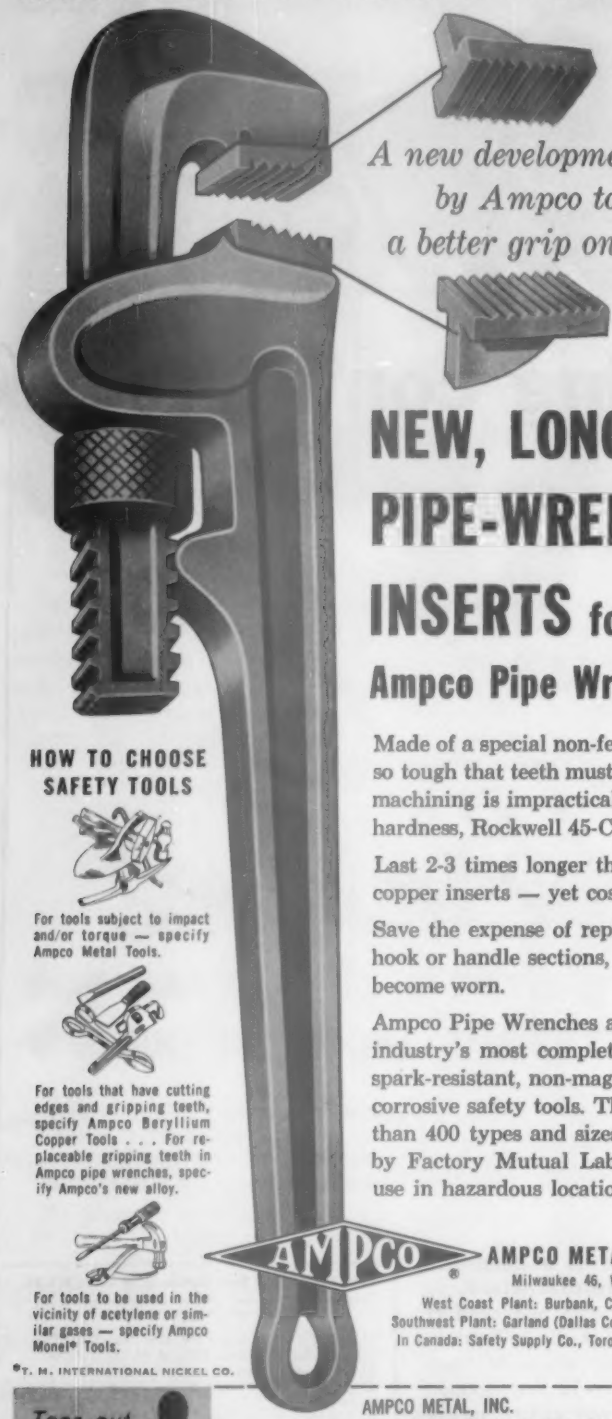

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Ultrasonic Detectives

—From page 21

wing cannot be gauged with standard instruments during machining. And the wing cannot be removed for gauging, because it cannot be repositioned with sufficient accuracy. Also, if removal were practical, calipers and micrometers would not be of much help in gauging such a long, wide slab of varying thickness.

Ultrasonics has solved this problem. The transducer probe is placed on various check points of the exposed surface to obtain thickness readings. The instrument is still accurate, even though the wing bows or lifts slightly off the table, a condition normally leading a machinist to cut off too much metal and ruin the entire wing.

There is often excessive stress in improperly cast parts. These stresses may lead to failure in flight.

The Vidigage consists of a continuously varying frequency oscillator feeding a transducer probe. The transducer converts the electrical energy of the oscillator into mechanical vibrations, and sends them into the material under test. A fluid couplant, such as oil or glycerine, is applied between probe and surface for maximum energy transmission.

When the resonant or natural frequency of this metal or plastic matches the transducer's vibrations, one or more vertical traces appear on the instrument's screen to indicate this frequency. Because the resonant frequency of a metal or plastic varies inversely with its thickness, calibrated scales placed in front of the screen permit a direct reading of thickness.

The ultrasonic resonance gauge can measure thicknesses from 0.005 in. to 3.2 in. with an accuracy of 0.1 to 1.0 per cent; yet it is easily used without prolonged training. Indications are given on a 14- or 21-in. screen (depending on the model); they are visible without strain at distances up to 20 ft. under normal shop lighting conditions. All readings are instantaneous.

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Mr. Harvey Childs, Jr., Sales Manager
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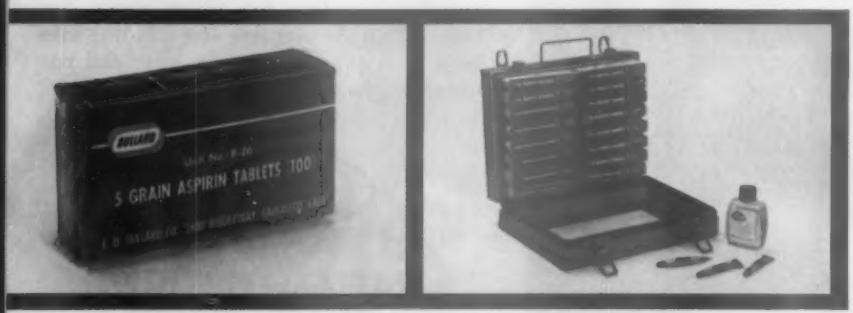

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TECHNICAL FEATURE SECTION

The Journal

OF THE AMERICAN SOCIETY OF SAFETY ENGINEERS

In This Issue

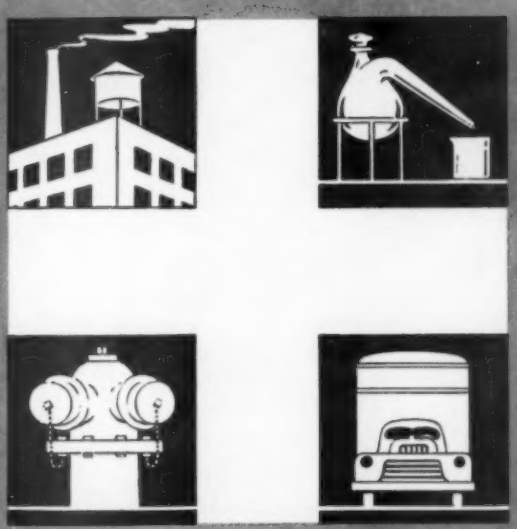
Our President Speaks on Safety ... *1*

What Is a Safety Engineer?
by J. Robert McCullough ... *2*

A Look at One State's Accidents
by John E. Russell ... 5

Eyes Are Expensive Targets
by Walter E. Montgomery ... *9*

Classifying Accident Causes and Evaluating Prevention Activities
by Robert Clair ... *13*



FEBRUARY, 1959

National Safety News, February, 1959

Letter from Author

To the *Journal* Editor:

After the publication of the November, 1958, issue of the *Journal*, I discovered an oversight in my article, "Introduction to Discussion Period" (pp. 55-6), which I should like to correct.

In this introductory material which I presented at the Brussels Congress, I inadvertently neglected to acknowledge that an important paragraph was the product of another author.

The entire second paragraph under the "Aid to Leadership" heading, page 56, should have been credited to a paper entitled, "Management's Responsibility for Accident Prevention," presented by Russell DeReamer at the Governor's Worker Safety Conference, Albany, New York, September 27, 1958. My apologies to Mr. DeReamer, the *Journal* and its readers.

Sincerely,
David L. Arm

"Introduction to Discussion Period" was related to the paper, "Safety Training for Foremen" by David L. Arm and Glenn F. Griffin, published in the November, 1958, Journal, *pp. 50-5.—Ed.*

AMERICAN SOCIETY OF SAFETY ENGINEERS

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OUR PRESIDENT SPEAKS ON SAFETY

RECENTLY several safety engineers were endeavoring to determine which was the most important single item in an effective overall safety program. Such subjects as selling top management, educating foremen and supervisors, prompt accident investigation, periodic physical inspections and mechanical guarding were presented.

Those who thought selling management was most important argued that accident prevention work can not go very far without top management support. Finances and leadership must be secured from the highest echelons. Employe reaction is quick to stem from management attitude.

Others argued that the foremen and supervisors should be responsible for accident prevention within their respective areas. Lack of interest on the part of one department head can spoil the record of the entire company. Foremen and supervisors must be educated in the ways and means of effectively controlling accidents. They must be instructed in the proper methods of following through on their responsibilities for accident prevention.

There were others who stated that the quickest way to take constructive steps is right after an accident occurs. Everyone, from top management downward, is anxious to avoid a repetition. Money can be secured more easily at this time. Also, supervisors and employes are more willing to co-operate with safety regulations. As an example, the result of the recent tragic school fire in Chicago caused many schools all over the country to be inspected more thoroughly than they had been surveyed in many years; sprinkler systems, enclosed stairwells and other means of protection were purchased. Many of these steps had been discussed previously but always were crowded out of municipal budgets in favor of other, seemingly more important, expenditures. Many improvements like these can be secured as a result of prompt, thorough accident investigation.

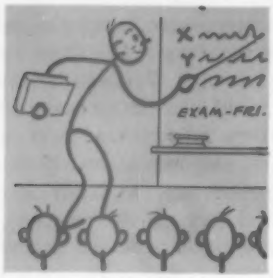
Still other safety engineers, in making their evaluations, believed that most can be gained by periodic physical inspections. If these are made thoroughly enough and frequently enough, the major causes of accidents can be detected. Proper corrective steps can be taken before an accident occurs. Improperly guarded machinery, machines with guards removed, unsafe acts of the employes, lack of use of protective equipment and plant physical hazards, in addition to machine hazards, can all be discovered. If all of these conditions are found and corrected before the accident occurs, it was said, the most important part of accident prevention is being conducted.

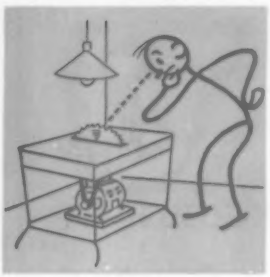
A few others argued for machine guarding. While the frequency of minor accidents is not to be ignored, machine accidents are the most costly from a severity viewpoint. Machines can and do sever limbs, crush parts of the body and kill or cripple workers for life. Furthermore, if we expect workers to operate safely, if we expect foremen and supervisors to accept their responsibility for accident prevention, we must furnish them with safe machines. If we are sure that the machines at which the employes are required to work are guarded as much as is humanly possible, we can then, and not until then, ask them to observe safe practices.

This discussion could be carried further using other items that rightfully belong in any well rounded safety program. It finally was agreed, however, that the importance of any single item at any particular time in an individual company will vary with conditions. The most important item this week for any single concern may be supplanted in a few weeks or months by one of the others. All of the above items must be in effect to some degree at all times. The successful safety engineer cannot neglect any single item for long. A continuous check to determine which item at the moment needs temporary concentration and effort seems to be the best solution.

Donald G. Vaughan

DONALD G. VAUGHAN, PRESIDENT
AMERICAN SOCIETY OF SAFETY ENGINEERS





BY

J. ROBERT

McCULLOUGH

what is

A SAFETY ENGINEER?

THE STORY is told of the back country lad who never had been off the farm and, upon his first visit to the city, was taken to the zoo. His eyes bulged in amazement when he was shown a giraffe. He shook his head in disbelief. "You can't fool me," he said. "There ain't no such animal."

For years many of us have been hearing the term, *professional safety engineer*. Having a speaking acquaintance with the engineering profession generally, for some years before entering the safety field I was at a loss to understand what a "safety engineer" was. Consequently, I failed to understand the constant cry for "recognition of professional status." But, of course, all human beings like recognition and certainly professional status would materially assist in the job of preventing industrial accidents and injuries.

During the last eight years I have traveled the length and breadth of the United States. I have attended conferences, meetings and seminars. I have spoken and have been spoken to.

I have learned a lot about people and why they have accidents and how to prevent them. I have met and talked with a great many safety engineers. I have been impressed by doctors of philosophy and their knowledge of *homo sapiens*. I have learned much from merchandising specialists and their means of creating desire. I have had my problems simplified by administrators who know how to organize people and get things done. I even have had my store of technical knowledge increased by representatives of the various branches of engineering.

But I have yet to meet the man who can answer, specifically, the question, "What is a safety engineer?"

Berman and McCrone, in their book, *Applied Safety Engineering*, define a safety engineer as "one who plans and executes the safeguarding of workers from personal injury and property from damage arising out of accidents." This is so broad that it says practically nothing and, actually, is more indicative of the foreman than of the professional safety man. W. Dean Keefer, writing in Blake's *Industrial Safety*, tells us what it is *not* when he says, "Safety engineer-

ing is not an exact science like mathematics, chemistry and physics," and Heinrich shies away from the term entirely.

Therefore, at one time I, like the boy from the farm, was convinced "there ain't no such animal." But saying doesn't make it so. There definitely is such a thing as a giraffe and certainly there are professional people whose careers are devoted to professional techniques of accident prevention. Our purpose here is to try to suggest a truly definitive answer to the question, "What is a safety engineer?"

Let us speak first of the technical aspects of the question. This definition of the profession also has been used: "A safety engineer is one who employs the arts and sciences of engineering toward the prevention of accidents and injuries." Fine! It's a beautiful statement. However, we must keep in mind that many safety authorities agree on the statement, "Approximately 85 per cent of all accidents and injuries are the results of human failure." Immediately, 85 per cent of the safety man's task is denied, for the most part, the weight of the forces of engineering. It becomes obvious that 85 per cent of his work has to do, principally, with motivating people; this hardly can be called engineering.

But before we get into the human aspects of the question, let's continue to discuss the engineering phase. The field of engineering is subdivided into such branches as mechanical, electrical, chemical, civil, etc. Shall we be mechanical safety engineers? . . . electrical safety engineers? . . . chemical safety engineers? Of course not. Yet certainly the general inclination of safety activity is dictated by the general line of the individual company or plant. If a firm is manufacturing machinery or fabricating metal, its safety problems are derived primarily from mechanical hazards; if it manufactures plastics, chemistry is in the forefront of safety thinking—and so forth.

However, it still is true that, regardless of a company's principal area of activity, it will have some contact with electrical problems, construction problems, etc. But isn't it also true that, if a company is large enough to afford a safety engineer, it also will have an Engineering Department—or some person or group to handle engineering problems? Then is the safety engineer going to try to cram into his cranium all that must be known about engineering plus what he must know to do the other 85 per cent of his job? Again the answer is, "Of course not."

The efficient safety engineer is going to organize the brains and the talent in his company into an integral unit working for safety. Certainly he must be able to discuss technical questions intelligently and even make useful suggestions. But the bulk of his job will be getting these other people to pick up their share of safety responsibilities. It seems logical to conclude that, while an engineering education is a definite asset and some technical knowledge is a necessity, engineering *per se* is but a very small part of the safety man's job.

Now let's look at that 85 per cent human failure problem—the real meat of any safety job. To succeed, it often is said, a safety program must have four basic components:

1. A sympathetic and enlightened management.
2. A mechanically safe plant.
3. Responsible and trained line supervision.
4. A sympathetic and participating working force.

In the company which employs the writer, these basic components are embodied in a document known as the President's Eight Point Plan for a Safe Plant. This plan, formulated several years ago, not only encompasses the four basic components but also spells out specifically such things as (a) establishment and operation of an Executive Safety Committee, (b) scheduling a monthly meetings between operating superintendents and their line supervisors and (c) the functions of the Safety Department.

There are two important parts to the first of the basic components—*sympathetic* and *enlightened*. The management probably is sympathetic or the safety engineer wouldn't be employed in the first place. But enlightenment "covereth a multitude of sins." Honest, sincere managements have been guilty of believing all sorts of fallacies about industrial safety, from "guard the machines and the accidents disappear" to "you can't enforce safety rules, you can only sell them."

It is the safety engineer's job to understand the elements of a successful safety program and to convince management of them. Management must be shown that, when the machines are guarded, only 15 per cent, or even less, of the job has been done—that while 98 per cent of employes will "buy" safety rules, the other two per cent must be made to conform, lest they undermine the whole program. This is the safety engineer's job. If his facts and approach are right, he will succeed. It is a selling job and selling is applied psychology backed up by a solid product.

As to Point 2—a mechanically safe plant—there

J. Robert McCullough is superintendent of safety, Hunting Park Plant, Budd Company. After studying mechanical engineering at Drexel Institute, he joined Budd in 1937 and held posts in engineering and production before entering safety work in 1951. Mr. McCullough currently is a member of the Executive Committee of the Society's Philadelphia Chapter.

is a bit of engineering here but, for the most part, it involves the obvious things like housekeeping, machine guarding and protective equipment. The engineering required here is included in the 15 per cent mentioned earlier. The tough part of this phase, however, is to get people to use the machine guards and protective equipment and to help keep the shop neat and orderly. So we come back to that selling bit again.

Perhaps we should consider Point 2 further, to include the designing of safety into plant, machine and processes! This is engineering—but who does it? The safety engineer? No, it is the design engineer, the only person who can do it. The safety engineer perhaps must sell him on the soundness, from the standpoint of economy, efficiency, productivity and loss prevention, and also perhaps must get across the idea that such design was the design engineer's privilege and responsibility in the first place. And here again we have a real working salesman, with a combination of technical knowledge and applied psychology, in the position of safety engineer.

Responsible and trained line supervision—Point 3—is the key to the successful work-a-day safety program. If the line supervisors don't make the program go, it won't go. It must be clearly understood by them that they, and only they, can work adequately with the people to produce successful results. Top management may make a pronouncement that "line supervision is responsible for operating the safety program." But who is the person who finally convinces the line supervisor that he is the keystone of the whole show? The safety engineer, of course. And how does he "engineer" that?

Even after a line supervisor wholeheartedly accepts his responsibility, he must be adequately trained. He is, in effect, the safety inspector for his own area or department and, as such, he must have special knowledge. Maybe the company has a Training Division, maybe not; but in any event, who will be in the forefront of training the line supervisor in safety procedures and techniques? You, Mr. Safety Engineer. And put away your slide rule; you won't need it here, either. Just like the boss and just like the worker, the line supervisor has to be shown what and how—and it's a selling job, an application of industrial psychology.

Finally, Point 4, your program must have a sympathetic and participating working force. This objective is a real adventure in mass psychology. Its success can be born only of a genuine love of people and a conviction of the validity of what you are trying to accomplish. Your people, to work with you, must be as sold on your program as you are. What a selling job that must be! Yes, discipline and enforcement must be used to some extent but, as was said previously, they are used directly for only two per cent of your people—and for keeping cancerous disrespect from eating back into the other 98 per cent. People don't want to get hurt in the first place but neither do they like being pushed around; unless they are sold on you and your program they will resist and your program will fail.

The same principle applies to unions. They owe their very existence to the recognized right of organized labor to bargain for wages, hours and working conditions. Working in a safe plant definitely is a working condition. When handled in a frank, intelligent manner and not "engineered," your union people can be a most helpful segment of the organization; and you need not, indeed it is not advisable to, surrender a single management prerogative to them.

In a nutshell, we safety engineers should be pursuing less the technical and engineering aspects of our jobs and concentrating more on motivation, psychology, advertising and selling. Our safety conferences should feature more appearances of such people as Dr. David Guy Powers, psychologist; Fairfax Cone, advertising executive; Walter Powell, industrial relations manager and others whose careers have been devoted to understanding and motivating people. We need technical information, most certainly, but safety has reached an area of maturity when the technical must assume its proper place in the scheme of things. An occasional technical speaker can add to the total picture but, for the most part, this can be relegated to the printed word in trade journals, safety publications, etc.

In the light of these considerations, let us try to unite around a definition of a safety engineer which truly describes our aims—one which includes the fact that the honest safety engineer is working toward self elimination (the chances of succeeding are most remote); which suggests that because of the safety engineer's powers of persuasion toward what he knows to be good, many of his fellow men are not being hurt or killed; which spells out that "a safety engineer is a technician who employs the arts and sciences of *psychology* and *engineering* for the prevention of accidents and their resultant injury to men and damage to property."

With common agreement upon what we are, what we should know and what we should be doing, safety engineers will be taking a big step toward professional recognition, at the same time earning the respect and the backing of our brothers in the various branches of engineering.

A LOOK AT
one state's accidents

BY JOHN E. RUSSELL

John E. Russell is supervising engineer of the Loss Prevention Department in the Norfolk, Virginia, office of the Liberty Mutual Insurance Company. With the company since 1949, Mr. Russell joined the Society in 1950. He holds a bachelor's degree in industrial engineering from the University of Tennessee.

WHAT IS the occupational accident picture in a state whose industry runs from coal mines to apple growing and from oyster fishing to lumber mills? To discover what types of accidents plague such a state, 1,000 disabling injury accidents from the 1957 files of the three Liberty Mutual offices in Virginia were chosen for investigation.

Practically every part of the Commonwealth of Virginia and every type of industry are covered in the study. There are injuries from the coal mines in the southwestern counties, from the apple industry in the upper valley, from clothing plants in Fredericksburg, from oyster operations on the eastern shore and from lumber mills at Suffolk. There are accidents from some of the smaller as well as from some of the larger industrial operations.

The direct dollar losses involved in the accidents studied amounted to almost a quarter of a million dollars. This, of course, includes only medical and indemnity and does not include the hidden costs, which conservative studies indicate are at least four times the direct costs. Using this four to one ratio, we can say that these accidents cost Virginia industry at least one million dollars. And certainly more important is the economic loss and physical suffering to the injured employes and their families.

Almost all types of accidents imaginable were included in the study. For example, one case involved four men who hid out under a truck to get out of the rain and were struck by lightning. Another involved the case of an employe who was "showing the foreman that a frankfurter machine was not working properly . . . stuck finger in machine . . . it was working!"

PARTS OF BODY INJURED

In making the study, we took from the files information giving (1) a description of the accident, (2) part of body affected, (3) days lost and (4) cost. The first thing we wanted to find was which parts of the body were injured. So we arrived at Table I in which we ranked the different parts of the body according to per cent of total number of accidents and per cent of total cost.

You will note that injuries to the hands were in first place both in cost and number. Injuries to the back were in second place in number, but dropped

Study of 1,000 Occupational Accidents in Virginia Points Up Most Common Types of Injuries and How To Avoid Them

PART OF BODY INJURED

PART	NUMBER	TOTAL COST	COST PER CASE	RANK	PER CENT OF TOTAL COST	RANK	PER CENT OF TOTAL NUMBER	RANK
Eyes	44	$ 3,279	$ 75	9	1.4	9	4.4	8
Head	50	18,092	362	2	7.4	5	5.0	7
Hands	270	77,862	288	3	31.5	1	27.0	1
Arms	55	14,884	271	4	6.1	7	5.5	6
Legs	106	17,142	162	6	7.0	6	10.6	5
Ankles	44	7,102	161	7	2.9	8	4.4	8
Feet	151	27,233	180	5	11.1	3	15.1	3
Back	160	21,671	135	8	8.9	4	16.0	2
Other	120	57,143	480	1	23.7	2	12.0	4
TOTALS	1,000	244,408	—	—	100.0	—	100.0	—

TABLE I

to fourth place so far as per cent of total cost was concerned. Injuries to feet ranked third in number as well as in cost.

Now that we knew which parts of the body stood high on the accident injury list, we decided to take a closer look at hand and foot injuries. (Since the back injuries seemed to be predominantly lifting accidents, no special study was made of them.)

HAND INJURIES

Our study of hand injuries (Table II) revealed that accidents on machines at the point of operation was our biggest problem. Ranking second, from the viewpoint of cost, were accidents involving the hands in belts and gears. And in second place in terms of number and third place by cost were accidents where the hands were caught between objects.

Knowing where hand injuries were occurring, we next asked what could be done about them. Let's take the machine point of operation first.

In each operation where the hands are exposed at the point of operation on a machine, we should ask ourselves questions such as these: *Is this step in the process necessary? Could an automatic feeding device be used?*

Having exhausted all means of trying to eliminate the hazard, we should move on to the next step—guarding the machine. To guard a machine successfully, someone must (1) see the need for the guard, (2) design a practical guard and (3) sell the machine operator on the value and importance of the guard.

Time studies, in some cases, have shown that the installation of point of operation guards not only has *not* slowed down production but actually has increased it. This probably has been due to the fact that employes lost fear and gained confidence.

Closely related to point of operation accidents are belt and gear accidents. It usually is much easier to guard belts and gears than the point of operation since, for the most part, it is not necessary to get to these during the time the machine is in operation.

Guards over power transmission equipment, such as belts and gears, must be substantial so that they will not give a false sense of security. They should be designed so that they can be easily removed and replaced by maintenance people. (In most cases, a guard can be installed with a hinge and a latch instead of a number of screws.)

Because so many machine accidents appeared to be caused by maintenance and cleaning *during operation*, a study was made of these. There were 32 such cases with an average of 91 days lost per case at an average cost of $436 per case. These were serious cases, yet ironical as it may seem, most of these could have been prevented with a three foot piece of quarter inch pipe. The pipe would be used to extend the grease fitting to the outside of the machine.

Many of these injuries occurred from machines starting automatically or being started by someone who did not know that someone else was around. Signs saying "Danger—Machine May Start Automatically," should be provided where appropriate. Lockout procedures should be given to all maintenance personnel in writing, posted where all can see —or both.

HANDS CAUGHT BETWEEN OBJECTS

Let's take a look at the other type of hand injury which was cause for concern—caught between objects. Education seems to be the best overall approach to reducing these.

I once knew a foreman who carried a mousetrap in his pocket. When he saw an employe putting his hand where it might get caught, he would take out the mousetrap, set it and ask the man if he would stick his hand in the trap. When the employe looked

TABLE II

HAND INJURIES

TYPE OF INJURY	RANK BY NUMBER CASES	RANK BY COST PER CASE
Machine: point of operation	1	1
belts and gears	4	2
Caught between Objects	2	3
Sharp Objects	3	4
Hand Tools	5	6
Burns	6	5

CAUSES OF ACCIDENTS

ACCIDENT CAUSE	RANK BY NUMBER OF CASES	RANK BY DAYS PER CASE	RANK BY COST PER CASE	TOTAL	RANK OF TOTALS
Lifting	3	8	10	21	5
Pushing and Pulling	14	10	13	37	11
Falls	1	3	3	7	1
Machine Injuries	4	2	2	8	2
Material Handling	6	6	12	24	6
Falling Objects	2	7	8	17	4
Struck Stationary Object	12	9	9	30	8
Struck by Moving Object	14	5	5	24	6
Caught between Objects	5	4	6	15	3
Splinters, Nails, etc.	9	13	15	37	11
Occupational Disease	13	11	11	35	10
Electrical	15	1	1	17	4
Burns	11	7	7	25	7
Flying Objects	10	14	16	40	12
Hand Tools	7	11	14	32	9
All Other	8	12	4	24	6

TABLE III

at him with that "are you crazy" look, the foreman would say, "All right, but remember, this trap would only bruise your fingers but, if you keep sticking them in places like that, you are going to get them cut off."

Another way to protect fingers and hands is to "carry a big stick." The stick would prevent many injuries such as those which occur when someone reaches under a piece of steel, a crate or some other object. If employes are taught to place a stick between objects before inserting their fingers, many of these accidents could be eliminated.

SAFETY SHOES AND FOOT INJURIES

Since foot injuries ranked third in number and cost, a special study was made of the 151 foot injuries. Of this group, 103—more than two out of three—injuries could have been prevented or could have been materially reduced in severity by the use of safety shoes. These cases averaged about 25 days lost time and about $152 direct cost per case. The 103 injuries represented more than 10 per cent of the 1,000 disabling injuries being reviewed.

Why is it that such a simple measure as the use of safety shoes is not adopted? I think there are three basic misconceptions regarding safety shoes that prevent their wider acceptance:

Misconception No. 1—Management, in some instances, is afraid the safety shoe program will cost money. But accidents cost money too—$152 per lost time foot injury. In most cases, all management need do is set up a method of deducting the cost of shoes from pay checks. Shoe manufacturers will assist companies in selling shoes by providing promotional and display material.

Misconception No. 2—Too many people believe that safety shoes are only for people who are handling heavy industry stuff like pig iron and the like. Safety shoes are designed for all industrial operations. One of the disabling injuries in our study resulted when a lady working in a restaurant dropped a gallon can of beans on her toes!

Misconception No. 3—Many workers have made up their minds before they try the shoes that they will be too heavy or will be uncomfortable for other reasons. Here's the answer to this one. Have the person who says safety shoes are too heavy for his work close his eyes. Then place two 50 cent pieces on the toe of his one shoe. Ask him if he can tell the difference in weight between that shoe and his other shoe. The coins weigh about the same as a steel toe cap.

A LOOK AT ACCIDENT CAUSES

We have discussed our 1,000 cases on the basis of the *part of the body injured.* Now, let's turn to a

breakdown of injuries on the basis of accident cause. As you will note in Table III, the 1,000 accidents were divided into 16 classes such as falls, machine injuries and material handling. Each of the causes was ranked by number of cases, by days per case and by cost per case. We then totaled all of the standings and ranked the totals. In this way we found that falls were our number one problem. Machine injuries were second and injuries from being caught between objects were third.

It is interesting to note that of the 120 machine injuries, only five could be classed as machine failure. And it appears that these five could have been prevented with proper machine maintenance—which brings us back again to human failure.

The classification of falls was so broad and appeared to be responsible for such a large proportion of the losses that a special study seemed to be indicated. Falls were responsible for 17 per cent of all the injuries, 33 per cent of the days lost and 23 per cent of the direct cost.

In Table IV, you will see that we have broken the fall accidents down into those caused by ladders and scaffolds, those resulting from poor housekeeping, those caused by stairways or uneven surfaces and all others. Ladders and scaffolds were major problems.

And don't be misled into thinking these ladder and scaffold accidents are all construction accidents. Many industrial establishments use various types of ladders. Unfortunately, many of these are makeshift.

WHAT CAN BE DONE?

So there you have the results of the Virginia survey. The question that remains is, "How does a safety man go about attacking such an accident problem?"

I have seen numerous successful safety directors and a few unsuccessful ones. I believe the successful ones learned early in the game that no one is capable of handling the whole job of accident prevention alone. These men weren't afraid to ask for help and they knew where to get it, for no profession has members more willing to help one another than the safety profession has.

What kind of assistance do you need and where can you get help?

To begin with, there is your State Department of Labor and Industry, the U.S. Department of Labor, the insurance companies, the National Safety Council and the American Society of Safety Engineers. These organizations usually have safety consultants who can assist you with designs of guards and similar devices and with safety programs. They can assist you in training your people. They can provide you with technical material, safety films and other visual aids, educational literature and the like.

Some of these organizations have industrial hygienists who can measure the degree of toxic dust, vapors, noise, radiation, etc. If you have a dermatitis problem, they may be able to help. In some cases they will be able to provide an industrial doctor or occupational health nurse to aid you in setting up and maintaining a medical program.

Sales representatives for safety equipment such as eye protection and safety shoes can be of help in getting these items accepted by the employes. If plant traffic control and fire or explosion hazards are a problem, try your local Police and Fire Departments.

You also should participate in technical societies such as the American Society of Safety Engineers. This will give you an opportunity to meet others who have problems similar to yours.

And any safety engineer worth his salt should have a safety library of current periodicals on accident prevention as well as some basic texts.

The needs of your particular industry and company will, of course, determine what type of specialized material you should have. The important point to remember is: don't try to do the job all by yourself in a vacuum. Get out and discover what others are doing. Read the publications and talk to the people who have the answers.

TABLE IV

ANALYSIS OF FALLS

ACCIDENT CAUSE	RANK BY NUMBER	RANK BY DAYS LOST	RANK BY COST	OVERALL COST
Ladders and Scaffolds	3	1	1	1
Poor Housekeeping	2	2	2	2
Stairs and Uneven Surfaces	1	3	3	3
All Others	4	4	4	4

EYES

are expensive targets

Eye Conservation Is Industrial "Must" which Can Bring Substantial Safety Rewards, Author Says

by Walter E. Montgomery

EYES ARE expensive targets and targets they are—for every flying or moving particle, large or small—for microscopic particles of inert or toxic dust, fumes, and mists or hazardous liquids such as the alkalies, acids or molten metals.

Few people realize that present day industry, by the very nature of its various processes, creates a constant fusillade of airborne objects that are an ever present hazard to the eyes.

If anyone is in doubt as to the degree to which the worker in heavy industry may be exposed to eye hazards, I should like to point out that one large company, in whose plant 20,000 goggle lenses are regularly in use, reports that 7,000 of these lenses—nearly one out of three—are replaced every year because they are broken, pitted, scratched or burned. Almost every one of these lenses has innumerable scratches or burn pits, each indicating the prevention of a probable eye injury.

NATURAL PROTECTION

Fortunately, nature did not wait for us to start an eye protection program; otherwise, we all might be blind by now. The eye is endowed with many elaborate features which tend to prevent or limit the extent of injury. The sensitive retina is placed at the back of the eye and many physiological and anatomical protective mechanisms are provided to safeguard it. To mention a few of these:[1]

1. The eyeball is cushioned in soft tissue and encased in a bony orbit which helps to protect against blows.
2. The movable tissues of the lids push aside under the force of flying particles, diverting them away from the eyeball.
3. The lashes form a screen for the exclusion of dust and other small particles of matter.
4. The tears have several protective functions. They contain a natural germicide which kills many of the pathogenic bacteria. Tears wash away dust, dilute harmful chemicals and tend to limit burns of the conjunctival tissue and cornea by evaporation.
5. The abundant blood supply of the lids and conjunctiva furnishes protection againt bacterial invasion through wounds.
6. The sensitivity of the cornea and conjunctiva gives notice of small foreign bodies and reflexes cramp the lids and hold the foreign matter fixed so that additional injury won't be caused by scratching or abrasion.
7. The eyeball rolls up involuntarily when danger threatens. This raises the central area of the cornea above the aperture of the lids, thereby protecting the most important visual area from injury.
8. The tough fibrous tarsal plates of the lids and the fibrous tissues of the cornea and sclera stop most foreign bodies, keeping them away from the deeper tissues which are more vital to vision.
9. The reflex closing of the lids, contraction of the pupil and absorption of electromagnetic and corpuscular radiations by intermediary tissues protect the retina against ordinary exposures.

Unfortunately, the protective mechanisms of the eye are not able to cope with the more severe hazards encountered in industry, so the least we

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can do is furnish the additional protection required to make certain that adequate facilities and qualified personnel are available for first aid and subsequent medical treatment of the injured.

EFFECTS OF PROGRAM

Statistics to stress the seriousness of the need for industrial eye conservation would be highly desirable. Unfortunately, data generally available by parts of body are not suitable for trend evaluation because of lack of uniformity in reporting and coverage.

However, a recent study covering five years' experience of nearly 2,500,000 U. S. federal employes provides some interesting facts on the results which can be obtained with an accident prevention program which stresses eye protection.

The Bureau of Employe Compensation of the U. S. Department of Labor, concerned about the high cost and frequency of disabling eye injuries, launched an intensive campaign with the following results. In 1951, 6.12 per cent of all disabling injuries involved the eyes; 1952, 5.88%; 1953, 4.9%; 1954, 4.45%; 1955, 3.96%—a reduction of 40 per cent in five years.

The study from which these figures are taken included more than 200,000 disabling work injuries. In addition to clerical work, federal employment includes nearly 100 different occupations. The large number of employes and the wide variety of occupations gives the study a good degree of representativeness and, while there is no assurance that the changes shown are typical of injury experience generally, it is likely that the direction of change for different parts of the body is fairly typical.

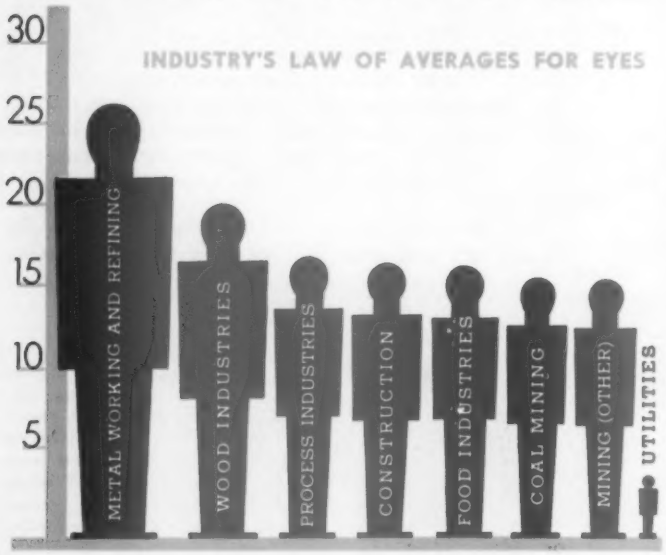
FACTORS IN EYE SAFETY

We all are well aware that manufacturing processes such as grinding, crushing, pounding, chipping, scaling, mixing, sawing, riveting, slicing, cutting, planing, etc., generate tremendous quantities of airborne missiles.

The surest method of preventing eye accidents is to eliminate the hazardous process, operation or substance which may cause an eye accident. However, until greater progress has been made in providing job safety procedure to eliminate this hazardous generation of flying particles, proper use of mechanical guards, goggles and head masks remains unequalled as a means of preventing eye injuries.

The safety engineer is plagued continually by the argument of goggles versus guards but analytical experience has shown that all types of protection are valuable to the degree they are effectively and efficiently used. The argument cannot be solved in favor of one system over another; the two protective methods should supplement each other. Neither affords complete protection at all times on all jobs but together they can do an efficient job.

In considering eyes in the total safety program, of course other factors also are important. For instance, an employe's ability to see properly must be an integral part of a thorough eye conservation program. Workers with defective vision must have corrective lenses in their safety glasses or goggles. And in the larger safety picture, for any industrial employe who works in proximity to potentially hazard-



Number of eye injuries per year per 1,000 men in principal industries is illustrated by chart at left, prepared by the American Optical Company. Rates include salesmen, executives and all others—may be much higher for workers actually exposed to eye hazards in plants which do not have goggle programs. Figures on which chart is based are given below:

Metal Working and Refining	26.5
Wood Industries	20.2
Process Industries	16.9
Construction	16.5
Food Industries	16.4
Coal Mining	15.7
Mining, Other (estimated)	15.4
Utilities	3.6

ous machinery, adequate eyesight and proper illumination are essential if he is to avoid bodily injury.

SAFETY GLASSES AND GOGGLES

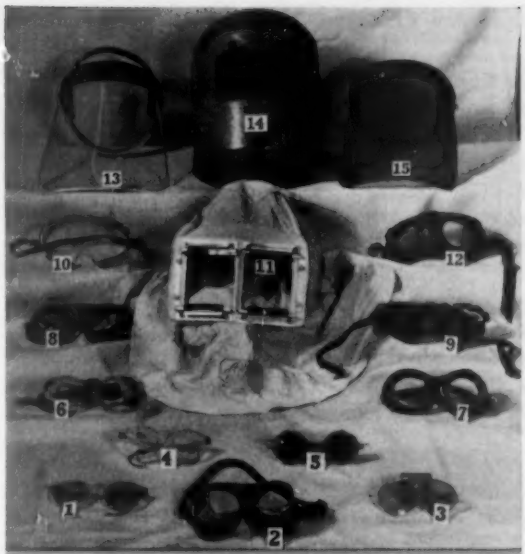
A survey of industrial eye injuries in the State of New York from 1950 to 1955 showed that cuts, punctures and lacerations of the eye accounted for almost half of the more than 2,000 eye injuries suffered each year during that period. Of the remaining cases, two out of five were caused by burns, including chemical burns and foreign bodies in the eye. There is every reason to believe that, had recommended industrial eye protection been worn, 9,000 of the 10,000 reported cases could have been prevented.

When the answer to this injury problem is so simple, it is astonishing that any company should be without a 100 per cent goggle program in every area of operation where eye hazards exist. The writer has had personal experience in helping to establish such programs in many industrial plants and has found that they pay handsome dividends. Companies which have instituted mandatory goggle programs have found no particular difficulty in enforcement when programs include common sense educational efforts.

Much progress has been made over the years in the development of goggles and other forms of head and eye protection, which have been designed for every known type of eye hazard. Present day goggles have been engineered to fit the contours of the face and to meet practically every objection that might be voiced by the employe.

In the past, due to scarcity of materials that would provide strength in accordance with the requirements of both the Canadian and American Standards for safety goggles, it was necessary to place compliance above cosmetic effect and the frequent remark that "they look funny" was only too true. Countless pairs of goggles were "worn in the pocket" for this reason. However, present day materials provide such a wide range of application that the safety standards for lenses and frames can be complied with and, at the same time, the product can be highly acceptable in appearance, even attractive.

The choice of goggles should not be left to the employe or his foreman. Even the safety engineer cannot select goggles properly without careful study. The exact nature of the particular eye hazard confronting a given workman and the details of the construction and materials of the various styles of goggles must be considered carefully. The hazards of certain occupations can be guarded against efficiently only by the type of goggles developed for



Different jobs require different types of goggles, as shown above by numbered collection of 15 eye protection items.

that particular hazard. The use of improper goggles may be as dangerous as failure to wear goggles at all.

Improper fitting has been found by the American Optometric Association to be the most common reason for failure to wear needed safety goggles. Employes report that the safety goggles are too tight, too loose, pinch the nose, blur their vision or for similar reasons do not fit their needs comfortably.[2] Such conditions are remedied easily by professional fitting. The company which insists that goggles be issued by the stock clerk seems to be asking for trouble.

VISION TESTS FOR EMPLOYES

While issuing safety goggles to a worker is a primary factor in protecting his eyes, plano lenses will not correct a visual deficiency and, as was mentioned earlier, good vision must be considered as a factor in any complete safety program. The purpose of an eye program should not be simply to place more glasses astride more noses but, rather, to see what optical aid each employe may need to help him work safely, efficiently and comfortably.

Eye tests are vitally important and should form a part of every pre-employment examination. Several optical manufacturers have available well planned and experience-proved programs, including testing instruments.[3] While mass examinations ordinarily do not diagnose specific defects, they can detect substandard vision and appraise visual skills for various

jobs. Employes needing correction should then be referred to appropriate professionals for attention.

(In prescribing corrective lenses for goggles or for ordinary spectacles, the refractionist should be familiar with the worker's job, especially the distance of the work level from the eye.)

Also, eye tests should be considered for older employes. Statistics indicate that industry is employing, progressively, a larger percentage of older employes. Industry cannot profitably disregard the normal physiological change that takes place in middle life, which includes a lowering of efficiency of the unaided human eye.[3]

"SELLING" EYE CONSERVATION

In providing a comprehensive, professional eye protection and vision program, it is necessary that the overall program be fully publicized with detailed explanations of exactly what is to be done and for what purpose. The employe should be fully aware of the treatment available to him, the mandatory aspects, the benefits to him and exactly how far the company is willing to go, financially, to provide him with good vision and eye protection.

Eye conservation programs have been known to produce very limited results because of inadequate preliminary promotion which has left an employe feeling that something was being done *to him* instead of *for him*. What a man does not understand he often is against. When an employe scoffs at any phase of safety, it is an indication that management probably is not presenting the idea to him to best advantage.

The safety engineer, the industrial nurse and particularly the foreman—all have daily opportunities to influence workers' attitudes toward regulations concerning eye protection and vision.

SUMMARY

"The science of human rehabilitation has developed artificial hands, arms and legs that can do almost anything the human member can do. But no one has yet produced an artificial eye that can see, nor does anyone dare predict that the day ever will come when it will be possible to replace the human eye with an artificial eye that will see." Such is the opening paragraph of a book published in 1924 by the National Society for the Prevention of Blindness.[4]

It is said that experience is a wonderful teacher but, unfortunately, experience often provides the answers too late to undo personal tragedies. We cannot wait for personal experience to impress upon the individual the importance of eye conservation. Now is the time to treat eye injuries as the serious industrial problem that they are. The success of countless firms which have been dissatisfied with their eye injury frequency and severity rates, and have determined to do something about it, is evidence of the correctibility of the problem.

And there seems to be no excuse today for industry to be uninformed concerning the visual adequateness of all its employes. Proper testing can be done at a reasonable cost and with a minimum loss of time from the job.

Eye protection should have a prominent place in industrial accident prevention for the simple reason that blindness, to any degree, for any period of time—whether it be total, partial or even momentary from dust in the eye—is tragic and costly to the individual, to industry and to society.[5]

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Eye examinations by qualified professionals are necessary for a complete industrial eye protection program.

Safety glasses and goggles must be comfortable to insure workers' cooperation. Fitting is not a job for amateurs.

CLASSIFYING ACCIDENT CAUSES AND EVALUATING PREVENTION ACTIVITIES

by Robert Clair

PART I: Fundamentals of the Highway Accident Problem

The national highway accident prevention problem has three elements—road, vehicle and driver. Under these three elements, various authorities classify seven or more major phases. Our interpretation consists of ten, each of which is intended to represent a major phase of the problem.

The following ten phases are *not* arranged in order of importance. Actually, *they should all be considered of equal importance.* Practically every important traffic safety activity can be included as a subdivision of one or more of these major factors. The mere knowledge that these phases exist may result in more effective discussion, improved planning and more accurate evaluation of specific ideas and suggestions.

1. *Laws and Legislation*—need, practicability, reasonableness, uniformity.
2. *Enforcement*—by police and courts.
3. *Motor Vehicle Administration*—by state officials charged with responsibility for administering motor vehicle laws.
4. *Accident Records and Statistics*—adequate, uniform and centralized accident reporting, investigating, analysis and interpretation.
5. *Highway and Vehicle Engineering*—(a) road design and planning, (b) economics and finance, (c) vehicle design and maintenance, (d) traffic operational analysis and control.
6. *Education in Schools and Colleges.*
7. *Public Information*—general education using all media of communications.
8. *The Human Factor*—(a) group driving performance, (b) individual driver behavior, (c) physical, mental and emotional limitations, (d) personal responsibility and attitude, (e) accident repeaters and chronic violators, (f) driver judgment under imposed conditions.
9. *Research*—continuous, in all phases of the problem.
10. *Coordination of Objectives, Planning and Functional Effort at State and National Levels.*

Contributing Causes—If we could isolate the major cause of traffic accidents, we would be able readily to devise an effective solution. This is not possible, so far, because of the inconstant nature of such accidents. For instance:

1. Among thousands of highway accidents, no two occur under identical conditions and circumstances.
2. Rather than one cause, routine investigation reveals that there are multiple contributing causes involved in each accident and there is an infinite number of combinations in which these causes may appear. A study made by the U.S. Department of Agriculture lists some 266 conditions that might contribute to a motor vehicle accident.
3. There is considerable evidence that present traffic accident cause statistics are inaccurate. Such statistics are based on accident reports written by one or more of the people involved. These may or may not be investigated by police, claims adjustors, safety engineers or others.

There are few people who understand or are able to recognize the multitude of potential cause factors. The National Safety Council says (in *Accident Facts,* 1954 edition), ". . . few accidents are investigated carefully enough to determine exactly what the underlying causes were." Thus, "when it is obvious that we cannot agree on who and what causes our accidents, it will be equally impossible to agree on what remedial actions should be applied."

For example, one investigator, Donald F. Buck, traffic safety engineer for the U.S. Department of

Robert Clair is assistant vice president of Liberty Mutual Insurance Company, Boston. A graduate of College of the Holy Cross, Mr. Clair entered safety work in 1920 and joined the Society as a charter member of the Boston Chapter when that group was organized in 1924. A past chapter chairman, he has held several national vice presidencies.

Figure 1 — Motor vehicle accident prevention activities, as shown on the wheel above, are classified as proximate (center section of the wheel), being under the control of a driver, or as remote from immediate driver control.

Classifying Accident Causes *Continued*

the Army, reports that he staged various ramifications of a traffic accident nine times in widely separated areas before audiences made up of legal minds, safety engineers, policemen, supervisors, statisticians and others with direct interest in accident investigation.*

These 1150 people were asked to investigate for specific causes, with the result that "no significant pattern or viewpoint could be identified among the different professional segments, except that police generally seized upon violations of the traffic code, attorneys tended to measure the incident in terms of 'last free chance,' 'negligence' and 'reasonable and normal responses' while safety engineers generally identified the unsafe act (legal or otherwise) that most directly led to the accident . . . The tests definitely prove the crying need for a more uniform approach to accident investigation."

Thus, statistics based on present accident investigations do not and cannot consistently reveal *one* major cause. However, clues to numerous major and minor causes exist. We need a rating scale for these known causes. Such a classification should enable us to apply preventive effort to those causes of greatest significance in proper proportion.

*Buck, Donald F., "Is Speed the Real Villain?" Commercial Car Journal, *October, 1953.*

PART II: Classifying Accident Cause Factors and/or Prevention Activities

Classification of highway accident cause factors is of major importance to enable us:

1. To visualize the basic problems.
2. To determine the various degrees of their influence on accident occurrence.
3. To select or devise effective accident prevention activities which, obviously, will be those designed to attack specific cause factors.

In classifying accident causes or cause factors, we are at the same time identifying the corresponding accident prevention activities.

Target Pattern—We propose a new method for arranging and identifying cause factors as being *remote* or *proximate* from the standpoint of immediate control of the individual driver. To produce this checklist, the ten major phases of the highway problem are subdivided to represent 22 specific accident cause factors—13 remote and nine proximate. The corresponding prevention activities follow the same classification.

Although certain cause factors can be named, there still are many blind spots regarding their meaning, analysis and application. This especially is true of the many phases of human behavior. There remains much for further research to contribute.

Usually associations and other large groups sponsor remote or long range accident prevention activities and individuals or smaller groups carry on proximate activities.

The 22 accident prevention activities are arranged in the form of the "target" shown on page 14 (Figure 1). Beginning with the outside perimeter, remote and proximate accident prevention factors (activities) appear in the order in which the driver can do something about them on the spot.

For instance, seated behind the wheel of his car, ready to start a trip, a driver can do nothing about law, law enforcement, road or vehicle design, research or motor vehicle administration. Nor can he do anything at the moment about education in schools and colleges, support from an informed public or the coordination and analyses of accident statistics. Furthermore, he must accept road conditions, weather, traffic flow controls and performance of other drivers and pedestrians as he finds them. These are long range, remote accident cause factors.

On the other hand, he has immediate control over maintenance of his car, his own physical condition,

the speed at which he travels, the interval of time which he allows for the completion of his trip, his knowledge, skill, attitude and decision. These are proximate factors.

The importance of *decision*, as perhaps the most significant accident cause factor, may be explained as follows: the success of any trip by any driver depends on the driver's ability to reach his destination without an accident. From the moment he begins a trip, a driver is faced by a continuously shifting sequence of unpredictable traffic emergencies or crises. He is called upon to make a chain of decisions—at the rate of 20 to 50 an hour, depending on traffic, according to an NSC newsletter (June 18, 1953). Each decision usually is arrived at in split seconds.

It has been shown repeatedly that most drivers involved in accidents are not deliberately careless or reckless—are not inveterate drinkers, need not possess a psychological complex nor be under temporary or permanent emotional stress. Most frequently, the person involved in an accident is normal and average, both physically and mentally.

But the more miles he drives, the more decisions he must make. Finally, the law of average appears, for no human being can make an infinite number of decisions, even under ideal conditions, and always be *right*.

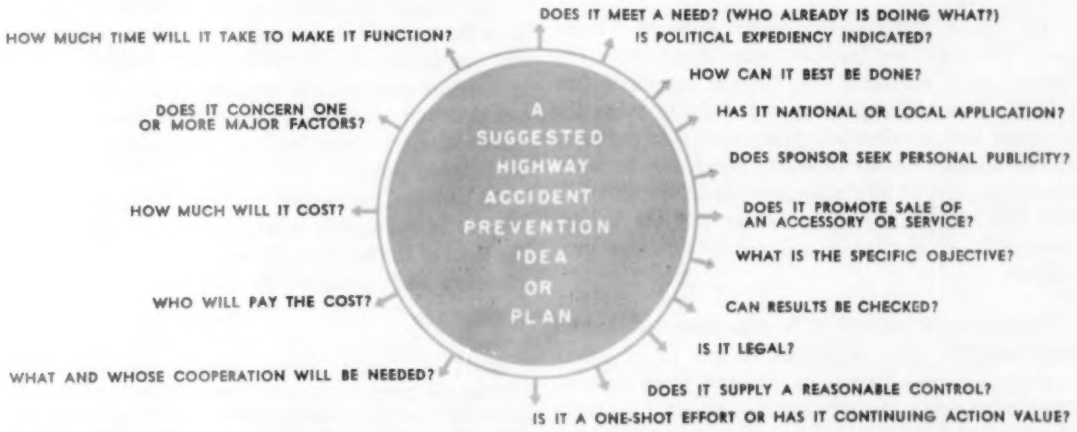
As there may be an infinite number of combinations of cause factors behind every motor vehicle accident, it follows that there is an infinite number of possible influences that may guide a driver's decision in any given situation. Various people claim that certain safety activities are more effective than others and it is difficult, if not impossible, to prove or disprove such contentions.

Final Action—The last proximate cause factor, immediately prior to the actual occurrence of an accident, we may call *final action*. It is the cumulative result of the influences exerted on the driver by remote and/or proximate cause factors—any one or a combination.

Final action may be what a driver *does* or *does not* do after making a decision. He may fail to make a decision, of course, or he may make a right or wrong decision. Also, after making a decision, he may be unable to perform the final action. Therefore, the ultimate phases of the highway problem—making the decision and performing the final act—are difficult to understand and analyze.

As with so many other activities, a person when he is driving a motor vehicle will have a good or bad accident record, depending on his effectiveness as an *individual*. It appears to this writer that we can improve our appeals (education and training) by segregating and applying those messages which will assist drivers in making a higher percentage of right (safe) driving decisions.

Since gentlemanly behavior generally is understood to be courteous, kind, considerate, just, humane and sympathetic, we can say that *"Drive like a gentleman"* is a general statement that encompasses the entire problem of safe driving. The true gentleman instinctively will make many safe decisions and actions in traffic regardless of the extent to which he is familiar with remote or proximate cause factors and the rules growing out of them.


A SUGGESTED HIGHWAY ACCIDENT PREVENTION IDEA OR PLAN
DOES IT MEET A NEED? (WHO ALREADY IS DOING WHAT?)
IS POLITICAL EXPEDIENCY INDICATED?
HOW CAN IT BEST BE DONE?
HAS IT NATIONAL OR LOCAL APPLICATION?
DOES SPONSOR SEEK PERSONAL PUBLICITY?
DOES IT PROMOTE SALE OF AN ACCESSORY OR SERVICE?
WHAT IS THE SPECIFIC OBJECTIVE?
CAN RESULTS BE CHECKED?
IS IT LEGAL?
DOES IT SUPPLY A REASONABLE CONTROL?
IS IT A ONE-SHOT EFFORT OR HAS IT CONTINUING ACTION VALUE?
WHAT AND WHOSE COOPERATION WILL BE NEEDED?
WHO WILL PAY THE COST?
HOW MUCH WILL IT COST?
DOES IT CONCERN ONE OR MORE MAJOR FACTORS?
HOW MUCH TIME WILL IT TAKE TO MAKE IT FUNCTION?

HOW TO EVALUATE A HIGHWAY ACCIDENT PREVENTION IDEA OR PLAN

Figure 2—Plan should be carefully researched by application of challenging key questions. Such evaluation should result in intelligent acceptance, modification or rejection of the idea.

PART III: Method for Evaluating a Highway Accident Prevention Idea or Plan

Many people sponsor and participate in many types of highway accident prevention work to produce either immediate results or to advance long range objectives. The introduction to accident prevention planning should include a statement of objectives and provision of a method for checking results.

The general problem usually is stated as being "to reduce the present loss of life, injury and damage occurring in the United States as a result of motor vehicle accidents." The general objective is "to prevent motor vehicle accidents without impeding the necessary flow of traffic."

Specific Objective—Any idea or plan needs a specific objective that pinpoints just what is to be accomplished. For example, "How many accidents are we going to try to prevent?" We can be idealistic and reply, "All of them." This obviously is impracticable as long as human beings are the drivers.

Again, it may be said that we intend to reduce traffic accidents to "an irreducible minimum." This is not a specific objective; it cannot be defined. Or we may say that we intend to reduce accidents "by 10 or 15 per cent during the next 12 months." This statement is usable but it should go further to indicate a given geographical area; usually a plan can not be effective nationwide.

Thus, at the very beginning of any deliberate safety effort, we find a difficult challenge in defining the specific objective.

Of course, many uncoordinated accident prevention "remedies" are launched without a specific objective. As a substitute, the hope is expressed that what is done (a) somehow will help to solve the problem and/or (b) will bring favorable publicity to the sponsor or his product. These can be sufficiently legitimate and adequate objectives although the first often is wishful thinking and the second sometimes is nothing but a public relations promotion.

Checking Results—It is reasonable to expect that progress from or results of any traffic safety activity can and should be checked from time to time to indicate the effectiveness of what is being done, to reveal any need for program modification and, generally, to decide whether or not the specific objective is being accomplished. Unfortunately, even with an objective that is reasonably specific, accurate checking is difficult because:

1. The activities of other groups carrying on similar or allied programs within the same area make it difficult to separate the respective results. (At least 30 responsible agencies conduct national programs on various phases of traffic safety. Hundreds of other groups frequently or occasionally carry on national, state or local activities.)
2. Uncontrollable external factors such as changes in national or local economy, weather, etc., exert an influence.
3. Complications arise from constant movement of traffic into and out of designated areas.

As a result, plans usually are launched by the sponsors as a "contribution to the cause" on the assumption that some accidents will be prevented and some favorable public relations will be created. But, when possible, some method of record keeping should be agreed on as being an indication, however inaccurate, of results being achieved.

Proposed Evaluation Method—Anyone writing a plan or responsible for judging the practicability of a suggestion should find helpful the method of evaluation outlined in Figure 2. (page 15). On this diagram, the principles of planning and fundamental facts discussed in this paper are incorporated in 16 screening questions. Accurate answers to these questions summarize typical research necessary for intelligent evaluation of a highway accident prevention plan and any idea which survives all 16 questions—even in considerably revised form—should possess unusual merit. An unfavorable answer to one question does not necessarily mean that a plan is impractical. Answers to all questions may not be necessary for every suggestion being tested.

Many ideas and plans will be modified or rejected long before the last question is reached. Sometimes the conclusion may be that it is preferable to join or support some already organized group rather than set up "just another" independent, uncoordinated, incomplete, repetitive, inadequate or, perhaps, sketchily planned project.

In addition, the outline in Figure 2 also may prove helpful in evaluating other ideas and plans outside the field of traffic safety. In any event, it should help planners and sponsors in keeping their thinking realistic.

EDITOR'S NOTE: This article was excerpted by the author from an internal research report which he prepared for his company, Liberty Mutual, under the title, "Methods for Evaluation and Planning of Highway Accident Prevention Activities" (not printed for general release). Part II of the article published in this issue of our Journal *previously appeared in the* Connecticut Journal of Industrial Safety, *XI, No. 1 (May, 1958), and is reprinted here with permission.*

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Membership Information

THE American Society of Safety Engineers has established the following classifications of active membership.

MEMBER — To be eligible as a Member an applicant shall be at least thirty years of age and shall be engaged in safety engineering. In addition, he shall have either an engineering or science degree in an accredited college curriculum and the equivalent of eight full years' experience in safety engineering; or he shall have had the equivalent of ten full years' experience in safety engineering.

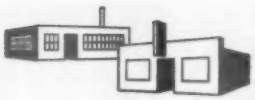
ASSOCIATE MEMBER — To be eligible as an Associate Member an applicant shall be at least twenty-five years of age and shall be engaged in safety engineering. In addition, he shall have either an engineering or science degree in an accredited college curriculum and the equivalent of three full years' experience in safety engineering; or he shall have the equivalent of five full years' experience in safety engineering; or he shall have either an engineering or science degree in an accredited college curriculum, ten years' experience in professional engineering work and one full years' experience in safety engineering; or he shall have twenty years' experience in engineering work, of which at least ten have been at the professional level, and one full year's experience in safety engineering.

JUNIOR MEMBER — To be eligible as a Junior Member an applicant shall be at least twenty years of age and shall be engaged in safety engineering work, which if pursued the required time will tend to qualify the applicant for the classification of Associate Member. In addition, he shall have either an engineering or science degree in an accredited college curriculum or he shall have had the equivalent of one full year's experience in safety engineering.

AFFILIATE MEMBER — The Society also provides a special classification, that of Affiliate Member, for those not professionally engaged in safety engineering. To be eligible as an Affiliate Member an applicant shall be at least twenty-five years of age and shall have contributed to the advancement of safety engineering through demonstrated achievement in some related field of interest in which he has been engaged for at least three years.

for additional information write to

The American Society of Safety Engineers
425 North Michigan Avenue
Chicago 11, Illinois
(or contact your local chapter)



SMALL BUSINESS and ASSOCIATIONS

By A. M. Baltzer and John T. Curry
Small Business Program Staff, National Safety Council

Free for the Asking

If you are interested in association safety committees, just write for our latest *Association Safety Guide No. 5*. It explains why 46 associations set up committees (87 per cent to reduce injury and insurance rates; 52 per cent as a result of board of directors' action.)

The *Guide* also describes duties of a committee, its composition, its time and budget requirements, and its effectiveness.

Association Safety Guide 4A, "Safety Survey Suggestions," a four-page folder, gives a step-by-step plan for getting facts on losses and safety activities in trade associations. It is also yours for the asking.

NSC Helps Associations Simplify Reports

The National Safety Council's Pulp and Paper Section initiated a move in behalf of several trade associations to consolidate accident statistical reporting forms by mill departments into one standard form. This would greatly simplify reporting accident statistics for firms which furnish statistics to and use statistics of such groups as:

The National Safety Council
U. S. Bureau of Labor
American Paper & Pulp Association
Pacific Coast Association of Pulp & Paper Manufacturers
Ontario Pulp & Paper Makers' Safety Association
Southern Pulp and Paper Safety Association

During the National Safety Congress, the executive committee of the Pulp & Paper Section approved the recommended form, which will be submitted to the various associations and agencies for adoption. Here is another example of the cooperative service available through the Council. Again, associations complement the work of the Council.

Link Safety to Profits

Within the past couple months we have noticed bulletins from three associations which emphasize safety as an operating cost control tool.

The British Columbia Loggers' Association warns members that "only by careful management, reduction of costs, and general increased efficiency can we hope to hold our own in competition with countries with a lower standard of living than ours."

The National Pest Control Association Safety Committee Chairman writes, "Blessings to all members who consider hazards and solutions which will help avoid bad publicity, improve employee morale, and increase net profits."

And they are so right!

Submit Model Bill For Labeling

A model bill to regulate the labeling of hazardous substances used by the consuming public has been prepared by four leading associations representing companies manufacturing and selling such products. The bill is designed as a model for federal or state legislation.

Copies of the model bill, plus a joint covering statement, have been sent by the four associations to state and federal officials and legislators for consideration in current sessions.

Further information on the bill or the joint statement may be obtained from:

The Manufacturing Chemists' Ass'n., 1625 Eye St., N.W., Washington 6, D.C.

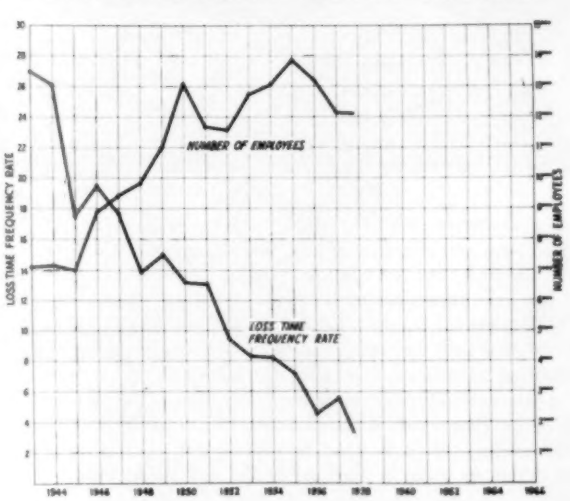
Chemical Specialties Manufacturers Ass'n., 50 East 41st St., New York 17.

National Paint, Varnish & Lacquer Ass'n., 1500 Rhode Island Ave., N.W., Washington 5, D.C.

American Petroleum Institute, 50 West 50th St., New York 20.

Circle Item No. 33—Reader Service Card →

GYPSUM INDUSTRY SAFETY RECORD



The December 1958, *Safety Bulletin* of the Gypsum Association illustrates here how injury rates can be cut through organized safety. Much credit goes to the Association, whose four-page *Bulletin* contains excellent promotional and technical information.

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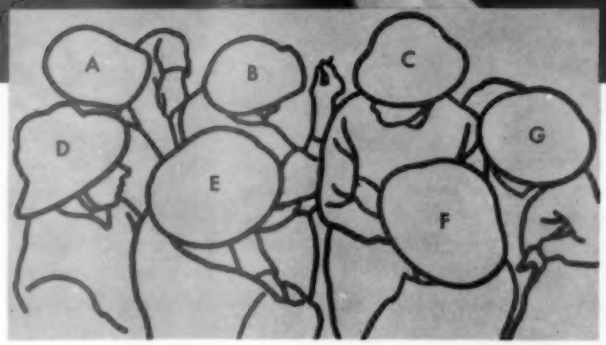

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AROUND THE COMPASS

ACTIVITIES • PROGRAMS • EVENTS

By Nils Lofgren

Field Service Department, NSC

Hammond Holds Teen-Age Conference

The Hammond (Ind.) Safety Council and the Hammond PTA sponsored a Teen-Age Traffic Safety Conference on November 19. Morning and afternoon workshops were devoted to Driving to School, Traffic Training and Safety, Drag Strip Racing—Pro and Con, and Legislation. The conference concluded with a dinner meeting, at which students reported on the workshop groups.

Sioux City, Iowa, Hires Traffic Engineer

As an immediate result of the Traffic Inventory Analysis presentation in 1958, the city council of Sioux City, Iowa, authorized City Manager C. Bodine to employ a qualified traffic engineer in this city of 89,000 persons.

Within two months of the analysis, the traffic engineer was on the job. The person selected to fill this position was Norman Barnett, whose prior position was with a private engineering firm in New Orleans. Mr. Barnett has also served in traffic engineering capacities in other cities.

Legislative Conferences Completed

The last of the four regional legislative conferences was held in Salt Lake City, Utah, from December 7-10. Other conferences took place in Atlanta, Boston, and Chicago. The purpose of these conferences was to encourage legislative study of the street and highway needs (exclusive of highway construction) of the operational agencies in each state.

It is expected that the information given to legislators at these conferences should ease the task of achieving state legislative needs in traffic. The fact sheet on uniform laws in the August issue of TRAFFIC SAFETY magazine provides background information and suggestions on achieving legislative measures needed in states.

The conferences were conducted by the Traffic Institute of Northwestern University with assistance from other national organizations, and were sponsored by the President's Committee for Traffic Safety and the Council of State Governments.

Changes in Memphis And Chattanooga

The president of the Memphis-Shelby County (Tenn.) Safety Council has announced the new manager of the Council is John Coll, former waterfront director for the Memphis parks.

Coll succeeds Eugene Glaze who resigned his Memphis position to become executive director of the Safety Council of the Chattanooga Chamber of Commerce.

Safetymycin

Much has been written lately about miracle drugs. Our doctors have certainly developed some fine things. However, aren't you overlooking me, an old tried and true remedy?

I am considered by all eminent physicians as the best medicine in the world. I can eliminate broken legs, pinched fingers, sore backs; and I can save lives. As far as accidents are concerned, I can eliminate the pain, the suffering, the tragedy, everything!

I sound like a wonderful medicine, I hear you say. I should make my discoverer rich. Believe it or not—in spite of all these wonderful claims—I have always been a tough one to sell. People just don't seem to want to buy me.

What's wrong? Lack of advertising? No, I've been given plenty of publicity. Cost? No, I'm free to all. Scarcity? No, I'm certainly available. You ask what's wrong with people—sounds like a bargain. To tell the truth, I just can't understand it either. It is both baffling and discouraging. People just won't use the best medicine.

You want some? Good! No, you don't need a prescription. Can you have my name? Certainly, and it's easy to pronounce, too. What's my name? Why I'm SAFETY, of course.—*Maricopa (Ariz.) Safety Council Newsletter.*

How telephone research "saves 77 years"

When the boy Galileo first observed the regular motion of a cathedral lamp set swinging by the wind, he had no thought of inventing the pendulum clock.

It wasn't until 77 years later that Huygens picked up Galileo's notes and applied the pendulum principle (no matter how far the pendulum swings, its movement consumes the same time) to an actual working clock.

The creative thinker today still does not always have a specific use in mind when, by equation or formula, he branches off from the accepted or ordinarily observed to the hitherto unknown. The classic invention of this decade, the transistor, evolved in the Bell Telephone Laboratories as scientists sought a deeper understanding of semiconductors. On the other hand, another great invention, the feedback amplifier, came from the acutely creative mind of one Bell engineer faced with a specific problem.

Current Bell Telephone Laboratories activities—in such areas as data transmission, radar and submarine cable development—call for the coordinated efforts of all types of thinkers and all types of approaches. One type complements another.

Today, 77 years would not have elapsed between the swinging lamp and the swinging clock pendulum—certainly not at Bell Laboratories, where ideas, though not rushed, are carefully advanced toward fruitful application in national defense, industry and communications. An important part of this harvest is the efficiency of America's telephone service, unequalled anywhere else in the world.

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Others tell us (so we don't need to be modest!) that these *"Supers"* with their exclusive suspension are the most comfortable, best looking and most economical that money can buy. All types of FIBRE-METAL safety and welding equipment are described in Catalog No. 26. Bulletin 55 covers hats and caps. **Ask your Welding & Safety Distributor!**

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Circle Item No. 34—Reader Service Card

Wire from Washington

—From page 42

or that of the vehicle and its occupants; and forbidding the use of vision-reducing matter on windshields, except for a single official vehicle-inspection sticker of prescribed size.

Traffic Safety. The first day of Congress saw a large number of traffic safety bills introduced. Congressman Roberts, chairman of the 85th Congress's Special Subcommittee on Traffic Safety, reintroduced three of his bills of the last Congress, as well as two new bills.

The reintroduced bills (with their new numbers) are: HR 920, requiring as initial equipment on motor vehicles such safety devices as may be specified by, and conform with, standards promulgated by the Secretary of Commerce; HR 1057, providing for mandatory federal safety standards for seat belts; and HR 1058, establishing federal grants-in-aid for research and facilities for driver training.

Mr. Roberts' new bills include: HR 408, directing the National Bureau of Standards to determine the safe level, for human health, at which unburned hydrocarbons and other products of fuel combustion may exist in auto exhaust, and authorizing the Secretary of Commerce to make recommendations as to means of reducing the harmful effects; and HR 1341, requiring that passenger-carrying vehicles other than military purchased or leased for federal use must meet safety standards prescribed by the Secretary of Commerce.

Mr. Roberts' bill on auto exhaust is intended to establish a standard of safety. Two other bills are of enforcement character, seeking to prohibit use in interstate commerce of vehicles discharging exhausts dangerous to human health; these bills are HR 1297 (McDonough) and HR 1346 (Schenck).

Other first-day traffic safety bills included: HR 722 (Bennett), requiring certain safety devices on motor vehicles sold, shipped, or used in interstate commerce; H. Res. 40

Circle Item No. 86—Reader Service Card

Stop explosions before they blow

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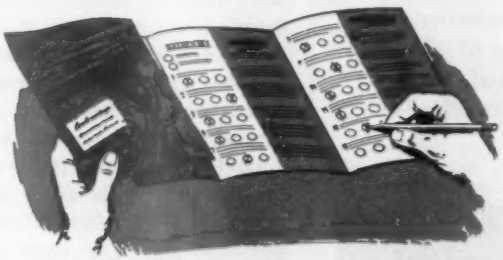

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Crouse-Hinds Company of Canada, Ltd., Toronto, Ont.

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● TRAFFIC CONTROL SYSTEMS ● AIRPORT LIGHTING and WEATHER MEASURING EQUIPMENT

These products are sold exclusively through electrical distributors. For application engineering help, contact one of the following offices: Baton Rouge Birmingham Boston Buffalo Chicago Cincinnati Cleveland Corpus Christi Dallas Denver Detroit Houston Indianapolis Kansas City Los Angeles Milwaukee New Orleans New York Philadelphia Pittsburgh Portland, Ore. Salt Lake City St. Louis St. Paul San Francisco Seattle Tulsa Washington Resident Representatives: Albany Atlanta Baltimore Charlotte Chattanooga Jacksonville Reading, Pa. Richmond, Va. Shreveport

FREE

CROUSE-HINDS CO.
Syracuse 1, N. Y.

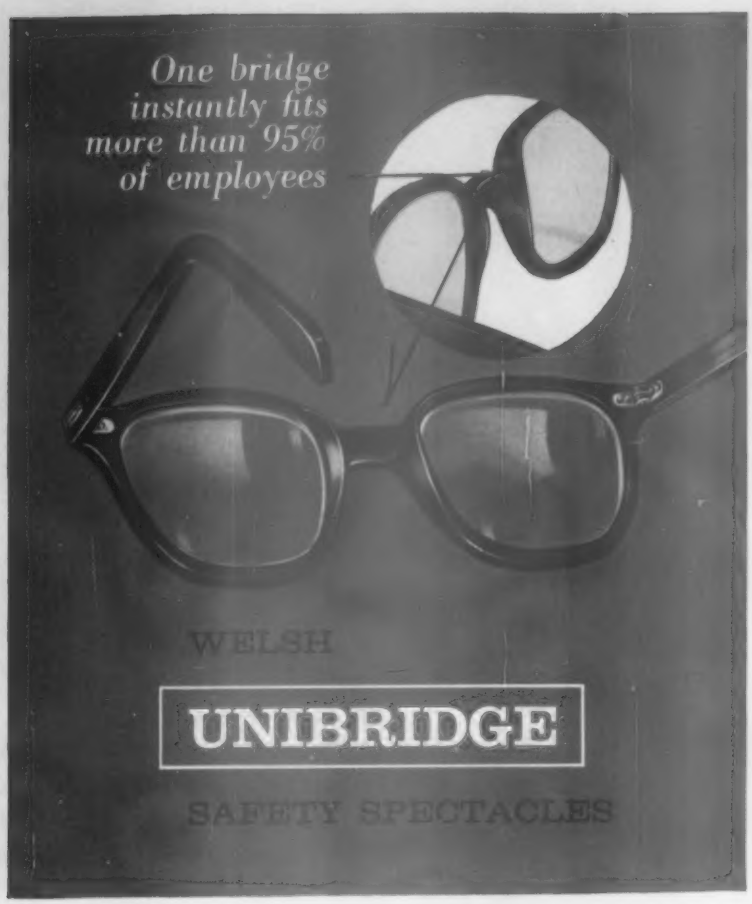
I want to check my plant. Send me your Hazard Finder.

Name_____

Company_____ Title_____

Address_____

City_____ State_____



Eliminate time-consuming fitting adjustments.
Slash inventory stock requirements.
Add new comfort and attractiveness for wearer.

Write for Bulletin #38 on the most modern safety spectacles . . . in popular frame colors . . . with the most complete range of temple styles . . . having added strength in butt joint temple construction . . . and permitting fast, easy identification of safety spectacles with new Welsh I. D. plaque.

Circle Item No. 35—Reader Service Card

(Lane), to authorize congressional investigation and study of safety of design of motor vehicles; HR 867 (Multer), to establish a nationally uniform system of automobile registration; HR 880 (Multer), to require certificate of fitness in sale of cars;

HR 881 (Multer), to provide for regulation of motor vehicles on highways; H. Con. Res. 21 (Multer), to express the sense of Congress as to establishment of uniform traffic laws in the United States; HR 639 (Saylor), to provide for a postage stamp bearing the phrase "Highway Courtesy Is Contagious"; and S. 130 (Capehart), to provide for medals of honor for persons who perform heroic acts in preventing serious highway accidents.

The Secretary of Health, Education, and Welfare announced an agreement whereby the automobile industry and the United States Public Health Service will work closely on research to reduce air pollution caused by auto exhausts. The industry will concentrate on developing effective devices, and the Public Health Service will concentrate on the health effects of such exhausts.

Aviation Safety. The Federal Aviation Act (See "Wire," September 1958) went into effect Jan. 1, 1959. The new Federal Aviation Agency absorbs the CAA, the safety rule-making functions of the CAB, and the Airways Modernization Board.

The CAB took two related actions. It requested the new FAA to investigate all fixed-wing aircraft accidents, where the plane weighed 12,500 lbs. or less, for report to the Board; and the CAB adopted new rules of practice in air safety proceedings.

Before going out of existence, the CAA reported "the accident ratio on the scheduled airlines was one of the lowest in public transportation with 0.4 fatalities per 100 million passenger miles flown." Total passenger miles flown during 1958 amounted to nearly 33 billion miles.

The CAB refused to change its rules, and held that flight training

is not a required safety qualification for a flight engineer, the third crew member required for jet passenger planes. The CAB's annual review of its Airworthiness Regulations proposes substantive changes in the requirements applicable to performance, flying qualities, power plants, cockpit controls and equipment. Among the changes proposed are provisions for fuel shutoff, to prevent fire in flight.

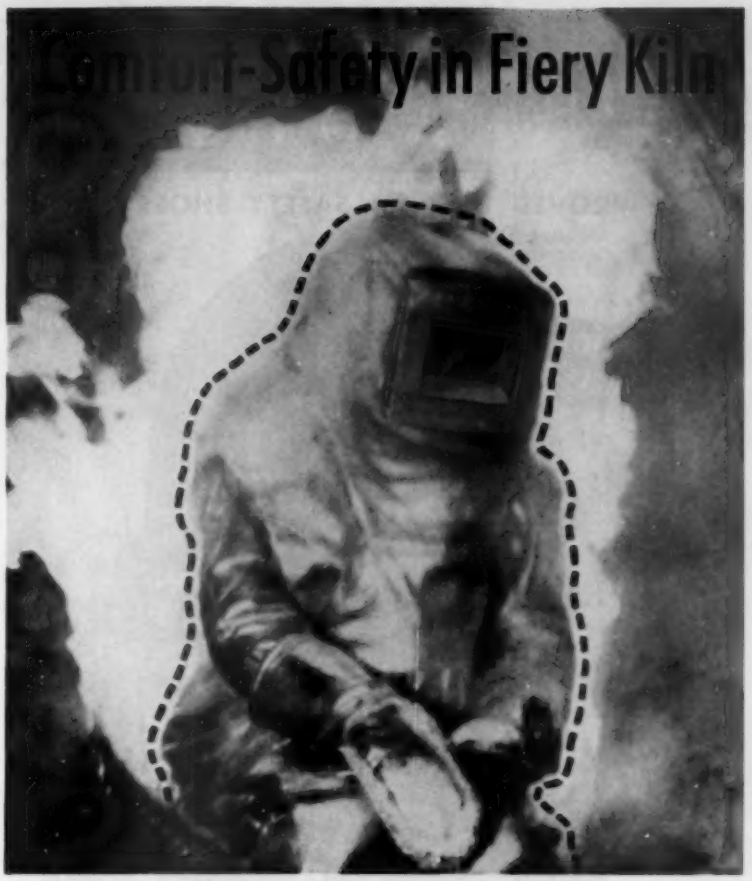
Marine Safety. Regulations were issued for two marine safety laws enacted in the last session of Congress: The Federal Boating Act of 1958 (See "Wire," September 1958); and the act relating to lights and day signals for certain types of vessels (See "Wire," September 1958.)

Public health. The Supreme Court of the United States sustained the action of the Secretary of Health, Education, and Welfare under the Food, Drug, and Cosmetic Act, in barring the use of a specified coal-tar color for oranges, as being toxic, and therefore not "harmless and suitable for use in food."

The color had poisonous properties, but no proof was offered that it was affirmatively harmful to human beings in food. The Court held that under the statute where a color is not harmless, it cannot be certified for use in food.

HR 1360 (Mrs. Sullivan) would amend the Food, Drug, and Cosmetic Act to provide for safety of chemicals in cosmetics. HJ Res. 57 (Jones, Mo.) would authorize the President to declare a National Poison Prevention Week, to aid in bringing to the American people the dangers of accidental poisoning.

The Food and Drug Commissioner issued notice of proposed regulations under the Chemical Food Additives Act (See "Wire," September 1958), and invited comments. The proposed rules indicate that in the evaluation of safety, the commissioner will rely on the criteria outlined by the Food Protection Committee of the National Research Council.



Aluminized Heat Barrier Safety
Garments cut costs, promote safety, give sure protection in highest temperatures

Lightweight, flexible, long-wearing garments made from 3M Aluminized Fabric provide greater safety—greater comfort—higher efficiency for men facing temperature exposures greater than 2000°F.

"It's the radiant heat that hurts" and Aluminized Fabric forms a heat barrier that reflects more than 90% of this heat. Industrial "hot spots" report of furnace and kiln repairs at operating temperatures *without time loss* for cooling . . . 30 to 50% longer garment life . . . higher resistance to molten spatter damage.

3M Aluminized Fabric is not a foil product, but a flexible coating of aluminum on a lightweight fabric. It is available from better safety clothing manufacturers. For further facts and samples, mail this coupon!

Free Swatches

3M COMPANY **ALUMINIZED FABRIC**

Minnesota Mining and Manufacturing Co., Dept. NW-29, St. Paul 6, Minnesota
Please send me 3M Aluminized Fabric swatches and information.

Name _____ Title _____
Firm _____
Address _____
City _____ Zone _____ State _____

"3M" is a registered trademark of Minnesota Mining and Manufacturing Company, St. Paul 6, Minn. General Export: 99 Park Avenue, New York 16, N. Y. In Canada: P. O. Box 757, London, Ontario.

Circle Item No. 36—Reader Service Card

New PARA-VINL

PROVED BEST for SAFETY SHOES

Para-Vinl . . . a dense, light gravity soling material with super resistance to oil, heat, acids and caustics. Altho light in weight, Para-Vinl equals or surpasses required safety box toe compression standards. Try Para-Vinl, the ideal new safety shoe soling material . . . you will be amazed at the difference!

Available in a full size range in colors Black, Brown, Oak 14-11 iron reduced shank Sizes 7 through 14.

GRO-CORD RUBBER CO.
LIMA, OHIO

Canadian Plant
GRO-CORD RUBBER CO. of CANADA LTD.
Tillsonburg, Ontario GC13

Circle Item No. 37—Reader Service Card

COMING EVENTS

in safety and related fields

Feb. 5-6, Los Angeles

Ninth Annual California Statewide Governor's Industrial Safety Conference (Biltmore Hotel). Michael Flagg, conference coordinator, 965 Mission St., San Francisco.

Mar. 1-3, Asheville, N. C.

Southern Safety Conference and Exposition (Battery Park and George Vanderbilt Hotels). W. L. Groth, executive director, P.O. Box 8927, Richmond 25, Va.

Mar. 4-5, Philadelphia

Twenty-fifth Annual Regional Safety and Fire Conference and Exhibit (Bellevue-Stratford Hotel). Harry H. Verdier, executive director, Safety Council, Chamber of Commerce of Greater Philadelphia, 121 South Broad St., Philadelphia.

Mar. 16-17, Boston

Thirty-eighth Annual Massachusetts Safety Conference and Exhibit (Hotel Statler Hilton). Bruce Campbell, manager, Massachusetts Safety Council, 54 Devonshire St., Boston, 9, Mass.

Mar. 17-18, Fort Wayne, Ind.

1959 Northeastern Indiana Safety Conference and Exhibit. Ivan A. Martin, manager, Safety Council, Chamber of Commerce of Fort Wayne, Fort Wayne, Ind.

Mar. 22-25, Houston, Tex.

Annual Texas Safety Association Conference (Rice Hotel.) J. O. Musick, general manager, Texas Safety Association, Inc., 830 Littlefield Building, Austin, Tex.

Mar. 23-25, Los Angeles

Sixth Annual Western Safety Congress and Exhibits (Ambassador Hotel). Joseph M. Kaplan, secretary-manager, Greater Los Angeles Chapter of the National Safety Council, 3388 W. 8th St., Los Angeles 5, Calif.

April 5-9, Cleveland Ohio.

1959 Nuclear Congress (Cleveland

Auditorium). Engineers Joint Council, 29 W. 39th St., New York, N. Y.

April 6-7, Toronto, Canada.

Annual Conference of the Industrial Accident Prevention Associations (Royal York Hotel.) R.G.D. Anderson, general manager, Industrial Accident Prevention Associations, 90 Harbour Street, Toronto 1, Ontario.

April 6-10, Cleveland, Ohio.

1959 Atom Fair, H. F. Grebe, exhibits manager, International Atomic Exposition, Architects Bldg., Philadelphia 3.

April 8-10, Gainesville, Fla.

Sixth Annual Conference on Accident Prevention Engineering (University of Florida). Donald B. Wilcox, conference coordinator, University of Florida, Gainesville, Fla.

April 9-10, Kansas City, Mo.

Fourteenth Annual Central States Safety Congress (Hotel President). George M. Burns, managing director, Kansas City Safety Council, 419 Dwight Building, Kansas City, Mo.

April 13-17, New York

Twenty-ninth Annual Safety Convention and Exposition (Hotel Statler). Paul F. Stricker, executive vice president, Greater New York Safety Council, 60 E. 42nd St., New York 17.

April 20-22, Syracuse, N. Y.

Sixth Biennial Central New York Safety Conference and Exposition (Hotel Syracuse.) Newell C. Townsend, administrative secretary, 351 South Warren Street, Syracuse 2.

April 22-23, Indianapolis, Ind.

Twelfth Central Indiana Safety Conference & Exhibit (Claypool Hotel). Jack E. Gunnell, director, Safety Council, Indianapolis Chamber of Commerce, 320 N. Meridian St., Indianapolis 11, Ind.

April 28-30, Columbus, Ohio.

Twenty-ninth All-Ohio Safety Congress and Exhibit (Deshler-Hilton Hotel). Arthur W. Moon, congress manager, Room 611, Ohio Departments Building, Columbus 15.

April 29-30, Cleveland, Ohio

Symposium on packaging and transportation of chemical products. Cleveland Engineering and Scientific Center. Manufacturing Chemists' Association, Inc., 1625 Eye St. NW, Washington 6. D. C.

May 4-6, Allentown, Bethlehem, Easton, Pa.

Thirty-second Annual Eastern

Now! FULL-POWER Fire Fighting with this complete dry chemical line!

Kidde top-rated portables and wheeled units kill more fire... faster!

From the powerful new 2½-pound portable, on up to the giant 200-pound wheeled unit, Kidde dry chemical extinguishers pack the *extra* punch needed for stubborn blazes, for *full-power* fire fighting. Available in pressurized 2½, 5, 10, 20 and 30-pound capacities, Kidde dry chemical portables feature simple, one-two operation, are easiest of all portables to operate, even while wearing gloves. Kidde portables have no valves to turn, no pins to pull, need no bumping or inverting. Just aim, pull trigger, and fire's out! All are quickly and easily pressurized, have dust- and moisture-proof gauges which show at a glance when unit is charged.

The 200-pound Kidde pressurized wheeled unit discharges a 40-foot dry chemical stream faster, has an *extra* 50 pounds of fire-smothering dry chemical to knock down fire quicker. It's faster and easier to operate... just remove pin, swing toggle lever, and flip on-off lever. Easy to maneuver because of its low center of gravity and larger wheels. Truly a one-man fire engine!

All Kidde extinguishers are granted top rating by Underwriters' Laboratories, are the finest extinguishers on the market today. Get more information about this *complete* line of *full-power* fire fighting equipment. Write to Kidde today!

Kidde

Walter Kidde & Company, Inc.
245 Main St., Belleville 9, N. J.
Walter Kidde & Company of Canada Ltd.
Montreal—Toronto—Vancouver

Circle Item No. 38—Reader Service Card

BLONDER-TONGUE OFFERS A FREE SURVEY TO DEMONSTRATE HOW INDUSTRIAL TV CAN BENEFIT YOU

Industrial television (closed circuit TV), the newest means of visual communication, is now increasing profits and efficiency for industry, science and education. Undoubtedly, there is some area of your present operation (continuous process control, quality control inspection, data transmission, plant or property protection, monitoring gauge and instruments, safety, dispatching, etc.) that can be improved by the use of industrial TV. The question is—what area?... How will it be benefited?... and what is the cost?

Blonder-Tongue and its nationwide staff of specialists eliminate all the guess-work in industrial television by offering you a free survey in your plant, office, etc. to demonstrate where and how industrial television will benefit you, what an installation involves and the cost. With industrial TV increasing efficiency at companies and institutions similar to your own, you can't afford to miss this opportunity to find out at no risk, no obligation what industrial TV can do for you.

Many leading organizations now rely on Blonder-Tongue industrial TV systems. Included among them are U. S. Steel, Sharon Steel, Southwestern Portland Cement, Johnson & Johnson, E. I. Dupont, General Motors, Brunswick Pulp and Paper, Union Carbide, Douglas Aircraft, Public Service of New Jersey, Los Angeles Dept. of Water and Power, St. Mary's Hospital, Albert Einstein Medical Center, West Phoenix High School and many others.

wire—phone or write today for a free survey

B-T LABS BLONDER-TONGUE LABORATORIES, INC.

9 Alling Street, Newark 2, New Jersey
Dept. NSN-2

industrial TV systems • master TV systems • high fidelity components • TV products • FM-AM radios

A completely automatic Blonder-Tongue industrial TV system (compact, rugged camera; automatic light compensator; TV monitor) providing quality pictures can be installed for less than $2,500.00.

Circle Item No. 39—Reader Service Card

Pennsylvania Safety Conference, Harold A. Seward, secretary-treasurer, Lehigh Valley Safety Council, 602 E. Third St., Bethlehem.

May 5-7, Niagara Falls, N. Y.

Nineteenth Western New York Safety Conference (Hotel Niagara). Clifford H. Seymour, executive secretary, Western New York Safety Conference, P.O. Box 315, Niagara Falls, N. Y.

May 12-14, Rochester, N. Y.

Second Triennial Genesee Valley Safety Conference and Exposition. (Manger Hotel.) William H. Keeler, secretary-treasurer, Genesee Valley Safety Conference, Inc., 55 St. Paul St., Rochester 4.

Calendar Contest Winners For November

What would your Safety Saying have said?

Robert F. Schaefer, research engineer, Chicopee Company, Milltown, N.J., won the $100 first prize in the National Safety Council's "Safety Saying" contest with this line:

You could be coming down with something fatal.

The contest appears monthly on the back pages of the Council's calendar. The theme for the November contest was "Get Help When Needed."

Second prize of $50 went to M. A. Kronsich, teacher in Wakefield (Mich.) High School. The entry was:

Hold it, champ! Where's your aide-de-camp?

Emil Karchnak, assistant electrical foreman, Bethlehem Steel Co., Johnstown, Pa., won third prize of $25 for this line:

Load hog!

The 30 winners of $5 prizes are:

Mrs. Chas. Camp (Individual Mem-

—To page 127

WHAT'S NEW

IN

NATIONAL SAFETY COUNCIL SERVICES *

* Look to this page each month for latest news about NSC services. Address requests for additional information to Membership Service Division, National Safety Council, 425 N. Michigan Ave., Chicago, 11. (NSC members are given a 10 per cent discount on all purchases.)

The Who of Accidents

Are You Safety Minded is a new publication of the National Safety Council.

The multi-colored pamphlet treats the accidents that are caused by people rather than those caused by unsafe work conditions.

"Some people," it points out, "can work safely in dangerous surroundings, while others manage to get hurt on jobs that should be quite safe."

The types of persons who most often have accidents—Sam Scoffer, Fatal Fanny, Johnny Know-It-All, Hazy Harry—are introduced with text and illustration.

Stock No. 192.15

Drive Like Professionals

The Professional Touch, a pamphlet aimed at reducing the number of off-the-job traffic accidents to industrial employees, has been published by the National Safety Council.

The 12-page, multi-colored pamphlet says you can—and should—be as professional a driver as the men who drive trucks, buses, taxicabs for a living.

"The professional touch," it says, "is essential in handling a motor vehicle skillfully and safely."

Tips on how to drive professionally, and examples of where the amateur driver goes wrong, are contained in the new publication.

Stock No. 294.08

For a More Successful Poster Program

POSTERS illustrated on the following pages are new, and actually are printed in two or more colors. NOTE: (1) The new 1959 poster directory is also available—with a wide variety of subjects. Stock of those directory-listed posters will be available at least until October 1, 1959. (2) Most posters appearing in NATIONAL SAFETY NEWS in 1959 will be stocked throughout the year.

JUMBO POSTER FOR APRIL, 1959

The Jumbo poster, issued monthly, is designed for outdoor use and is available to members on annual subscription but is not stocked. Its actual size is 9' 11" by 11' 8".

SAFETY BANNER FOR APRIL, 1959

Here is the attention-getting, monthly cloth banner. Available in two types —indoor and outdoor—both are identical in size (10 feet long by 40 inches high), have the same general message and multi-color design. Indoor type is of sturdy drill with grommets for easy hanging, while the outdoor banner is of extra heavy drill with wind vents, and has strong stitched-in rope for durability.

1561-A 8½x11½

This new four color poster is illustrative of the 72 four color posters shown in the 1959 Poster Directory.

Electrotypes of poster miniatures on this page are not available, nor can payroll inserts be supplied.

Posters below are printed in two or more colors

(Available only in sizes indicated)

©NATIONAL SAFETY COUNCIL

1541-B **17x23**

©NATIONAL SAFETY COUNCIL

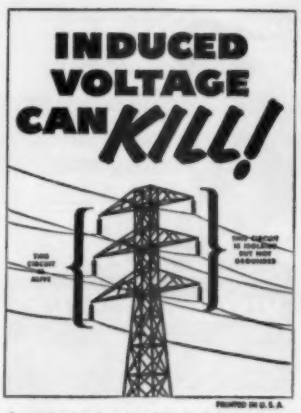
1546-B **17x23**

©NATIONAL SAFETY COUNCIL

1504-B **17x23**

©NATIONAL SAFETY COUNCIL

1319-A **8½x11½**



©NATIONAL SAFETY COUNCIL

1532-A **8½x11½**

©NATIONAL SAFETY COUNCIL

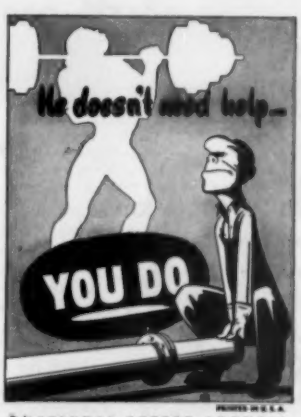
1517-A **8½x11½**

©NATIONAL SAFETY COUNCIL

1476-A **8½x11½**

©NATIONAL SAFETY COUNCIL

1308-A **8½x11½**



©NATIONAL SAFETY COUNCIL

1307-A **8½x11½**

Electrotypes can be furnished for all posters illustrated above.

Posters below are printed in two or more colors

(Available only in sizes indicated)

©NATIONAL SAFETY COUNCIL

1552-A 8½x11½

©NATIONAL SAFETY COUNCIL

T-1542-C 25x38
T-1543-A 8½x11½

©NATIONAL SAFETY COUNCIL

T-1467-B 17x23

©NATIONAL SAFETY COUNCIL

V-1558-A 8½x11½

©NATIONAL SAFETY COUNCIL

V-1559-B 17x23

©NATIONAL SAFETY COUNCIL

V-1557-A 8½x11½

POSTER ORDER FORM

SHIP TO:

*Organization*_____

*Address*_____

*City*_____ *Zone*_____ *State*_____

*To attn. of*_____

SEND INVOICE TO:

*Organization*_____

*Address*_____

*City*_____ *Zone*_____ *State*_____

*To attn. of*_____

ORDERED BY

*Customer's P.O. Number*_____

PRICES EACH	"A" SIZE (ALL)	"B" SIZE (EXCEPT PREFIX T-)	"B" SIZE (PREFIXED WITH T-)	"C" SIZE
1-9	$ .15	$ .30	$ .25	$ .35
10-99	.092	.22	.18	.27
100-999	.063	.185	.15	.22
1,000-4,999	.052	.15	.12	.20

Prices subject to 10% discount to members. Quantity prices apply only on a single shipment to one location.

Quantity	Poster No.	Quantity	Poster No.

ADDRESS ORDER TO: NATIONAL SAFETY COUNCIL, 425 N. MICHIGAN AVE., CHICAGO 11, ILLINOIS

Electrotypes can be furnished for all posters illustrated above.

Industrial Hygiene

—*From page 33*

open-face type for general air sampling or may be designed to be placed in a sampling line for stack sampling.

Air Movement Equipment

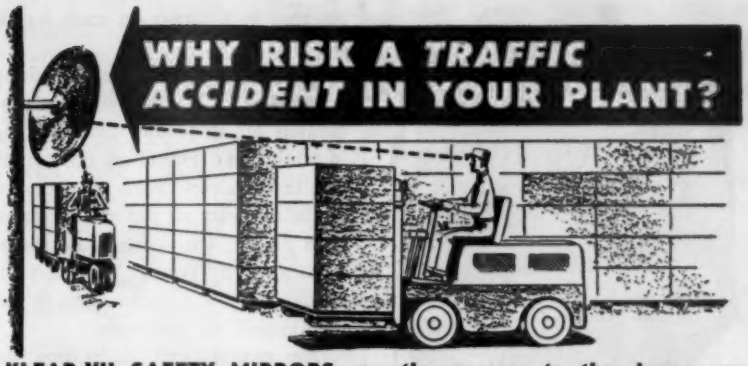
In selecting air-movement equipment, consideration should be given to weight, rate of air sampling, and resistance pressure of the sampling device. To handle the several types of air samplers, a number of air movement devices should be available.

Air Pumps. The MSA hand-operated 4-cylinder reciprocal pump widely used for sampling air through midget impingers has the advantages of light weight, adequate capacity for many sampling devices, and does not require electric power.

Where electric power is available, motor-driven air pumps permit the industrial hygienist to have more freedom in observing conditions while sampling is going on and to operate two or more sampling devices at one time. In selecting an air pump, it should be kept in mind that some of the air samplers involve a rather high resistance pressure, as, for example, 3 in. of mercury for the large size impinger. An electric motor and pump unit with capacity to handle two large size impingers simultaneously may weigh as much as 30 lbs.

Air Ejectors. To be able to draw air through one or two large impingers with a comparatively light suction unit, a device using a No. 2 Hancock ejector has been assembled by the Willson Products Company. This unit includes a connection for high pressure compressed air, a pressure gauge, and an ejector. On the suction side of the ejector is a union containing a fixed orifice of such an area that exactly 1 cfm. of air is drawn through the impinger. When it is desired to operate two large impingers simultaneously, a T-fitting may be screwed on the suction side of the

Circle Item No. 40—Reader Service Card



KLEAR-VU SAFETY MIRRORS are the answer to the dangerous blind corner problem in your plant or warehouse. They are also adaptable for outdoor use in your parking lot, loading dock area or other points where traffic converges.

Mounted at cross aisle intersections, entrances and exits at a height of 8 to 10 feet, Klear-Vu Safety Mirrors clearly reflect oncoming intersection traffic to both power truck operators and pedestrians.

Style	No.	Dimensions
Circular Convex Glass	120	12" dia.
Circular Convex Glass	188	18" dia.
Circular Convex Glass	240	24" dia.
Circular Convex Glass	300M.R.	30" dia.
Circular Convex Glass	360M.R.	36" dia.
Flat Glass Rectangular	918	9"x18"
Flat Glass Rectangular	1640	16"x24"

M.R. indicates metal rim.

Available in either convex or flat glass styles, the mirrors are easily installed and quickly adjustable to any desired angle.

Special sizes made to order. Polished flat metal mirrors available.

LESTER L. BROSSARD CO.
540 N. MICHIGAN AVE., CHICAGO 11, ILL.

Write for Bulletin.

SURETY

SURESEAL GOES HAND in GLOVE WITH THE TOUGH JOBS

Your production machinery is an extension of the skilled hands that operate it. Protect those hands with Surety Sureseal gloves.

Sureseal, with exclusive Turn-Cuff, gives maximum security against crippling accidents and skin diseases wherever hands are exposed to chemicals, solvents, oils, etc. Sureseal means savings, too, because production increases and costs drop where injury causes are minimized.

Sureseal, made from Hycar, offers more effective resistance to solvents and other caustic liquids and lasts up to 14 times longer than rubber and other synthetics.

Test Sureseal at our expense. Write us on your letterhead outlining the job requirements and we'll send you a pair of Sureseals by return mail.

THE SURETY RUBBER CO.
CARROLLTON, OHIO

In Canada: Safety Supply Co., Toronto

Circle Item No. 41—Reader Service Card

Wonder-working ELIMSTAPH #2 kills Staph and other bacteria as it cleans your floors. Here's why leading industrial plants and hospitals specify it for daily maintenance:

POWERFUL:
3 to 6 times more potent than most germicides, it boasts a phenol coefficient of 33.

RESIDUAL:
retains killing efficiency as long as it remains on the floor.

ECONOMICAL:
one oz. makes one gal. solution. Does a superb cleaning job, disinfects, deodorizes in one operation.

SAFE:
colorless, odorless ELIMSTAPH #2 has lowest toxicity.

VERSATILE:
Use it on walls, furniture, lavatories, garbage cans.

Get *all* the facts. Learn what famous York Research Corp. says about ELIMSTAPH #2. May we send you their bulletin? Clip the coupon, please.

WALTER G. LEGGE CO., INC.
Dept. N-2, 101 Park Ave., N. Y. 17, N. Y.
Branch offices in principal cities.
In Toronto — J. W. Turner Co.
Please send the York report and full data on Elimstaph #2.

Name_____
Title_____
Firm_____
Address_____
City_____ Zone____ State____

Circle Item No. 42—Reader Service Card

ejector and a calibrated orifice plate inserted in a union on each leg of the T.

This ejector device is especially convenient in areas where compressed air is readily available, as in mining and tunnelling operations and in foundries. With air pressure at the entrance of the ejector more than 25 psi., the orifice plate maintains a steady flow of 1 cfm., even though there are fluctuations in the compressed air pressure.

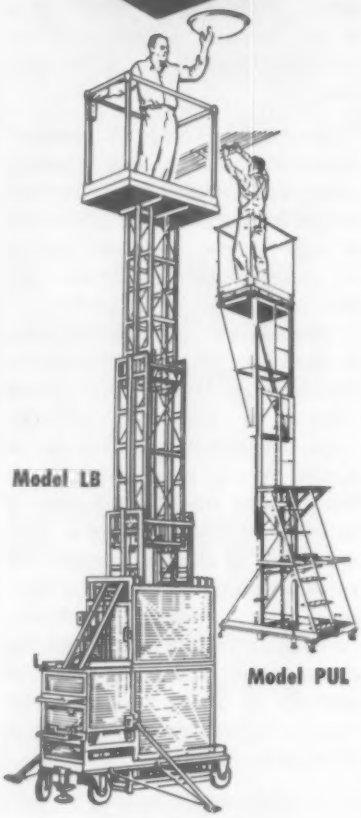
An ejector unit depending on Freon gas[6] has recently been introduced and is commercially available as the Uni-Jet air sampler. This consists of a pressure bottle containing Freon with a valve controlling the flow into an ejector. Depending on the size of the orifice, four of these being supplied with the unit, sampling rates may be obtained over the range of 2 to 10 cu. ft. per hour. The rotometer supplied with the instrument is calibrated in cubic feet per hour (not per minute) and in liters per minute. This unit may be used for drawing air through a midget impinger or through a millipore filter. The rate of air flow should be noted from time to time and the Freon valve adjusted to maintain the desired rate of air sampling.

High Volume Samplers. As it is frequently desirable to obtain a sufficient amount of the sample for determination of the free silica content or other constituent of a dust or fume, it is necessary to have an air-sampling device to collect the particulate matter from a large volume of air. The Staplex Hi-Volume sampler operates at a rate of 18 to 70 cfm., depending on the density of the filter.

Where the highest of these air flows is desired, then a pleated filter must be used to give greater surface. In the ordinary use of this filter, a voltage regulator may desirably be placed in line and the sampler operated at reduced voltage. This has the advantage of providing longer life for the motor of the sampler.

With such a sample, rate of air flow decreases as deposition of the

90% of overhead servicing can be done faster and safer with these ECONOMY Hi-Reach Telescopers!



Model LB
Hi-Reach Telescopers
Four heights 20 ft. to 35 ft.
Standard Models from $1510.00 up.

Model PUL
Three Standard Models
No. 1 — Lift 10' 9" $370.00
No. 2 — Lift 11' 9" $390.00
No. 3 — Lift 15' 0" $400.00
Rubber tired wheels $10.00 extra
F.O.B. Chicago

Custom built Hi-Reach Telescopers up to 100 ft. Write for complete catalogue. Economy Engineering Co., 4518 W. Lake St., Chicago 24, Ill., 342 Madison Ave., New York 17, N.Y.

ECONOMY ENGINEERING

Circle Item No. 43—Reader Service Card

particulate matter increases the resistance of the filter. It is understood that a device is to be available for use with this high volume sampler which will maintain a uniform air flow even with increased resistance during the sampling period.

The MSA Fixt-Flo air sampler provides for a constant flow rate of 15, 30 or 50 cfm., depending on the setting. An automatic compensating damper mechanism has been built into this high volume sampler to maintain the uniform flow rate. A number of filters are available for this unit. These are composed of cellulose, of glass fiber, or of a combination of glass and cellulose fiber and are of varying densities. A calibration device is available for checking the precision of air flow at the various settings.

Grab Sample Devices

Where it is desirable to obtain a quick indication of the amount of injurious gas or vapor present, a grab sample device is often the instrument of choice. These devices will give the concentration of a gas at a given point usually through a change in color of a reactive chemical or by the distance that a color change proceeds along a tube containing the reactive material. The precision of a number of these devices is not too great, but with an understanding of what is to be expected of them, they provide useful information.

Mine Safety Appliances Company has developed aspirating devices and reagents for carbon monoxide, hydrogen sulfide, hydrogen cyanide, sulfur dioxide, aromatic hydrocarbons, chromic acid, arsine, hydrogen fluoride, unsymmetrical dimethyl hydrazine, lead, and for carbon monoxide in alveolar air and in blood. A midget impinger kit provides a colorimetric method that is available for the immediate determination of toluene diisocyanate and, with a kit using 50 ml. syringes as the sampling devices, a field method has been developed for nitrogen dioxide. Under development at present are grab sample devices for chlorine, chlorinated hydrocarbons, mercury, and the boron hydrides.

The carbon monoxide detector is an example of an instrument depending on a color change. The detector tube contains silica gel impregnated with a complex silicomolybdate compound and a palladium sulfate catalyst. Carbon monoxide is drawn through the tube by a rubber squeeze bulb. Carbon monoxide causes the yellow color to change to green and then to blue with increasing concentrations. It is important to observe that each squeeze of the rubber bulb should pull the air through the tube in a 30-second period for the reading to be accurate. The color in the tube is compared with a color scale on the instrument.

The hydrogen sulfide detector is an example of a device depending

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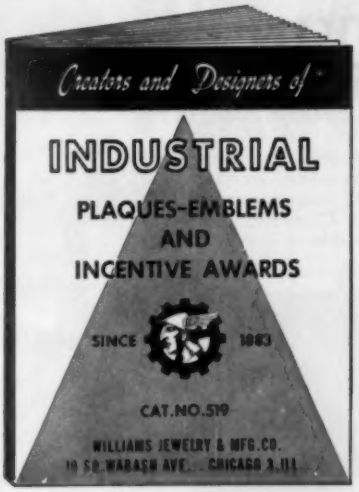

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on the use of the distance that a coloration proceeds along the tube as a measure of the concentration of gas in the air. Silver cyanide impregnated in activated alumina granules turns black on contact with hydrogen sulfide. If concentrations may be expected at levels close to the maximum acceptable concentration of 20 ppm., a small diameter tube is used with a scale reading from 0 to 50 ppm. If higher concentrations are anticipated, such as may represent danger to life, a larger diameter tube is used with a scale reading from 0 to 0.04 per cent or 400 ppm.

Several reactive chemicals used in detector tubes are not stable over an appreciable period, and their components must be mixed shortly before use. An example of this type of indicator is the MSA hydrocyanic gas detector supplied with two sealed ampules, one containing copper sulfate and silica gel and the other containing ortho-tolidine sand. During a test, the two chemicals are mixed in a bottle supplied with the unit, and the detector tubes are filled with the chemical mixture and enclosed with rubber caps.

If the tubes can be kept at 40 F, they retain their sensitivity for two months, but if they are stored at temperatures as high as 90 F, they should not be used after one week. These tubes are placed in a holder similar to that of the carbon monoxide tester and the air drawn through the detector tube. The distance that the stain produced on reaction with hydrogen cyanide travels along the tube is a measure of the concentration of hydrogen cyanide present. The scale of the instrument is calibrated for the range of 0 to 50 ppm. HCN.

The MSA lead-in-air detector kit uses a pump of 500 milliliters capacity and permits determination of the weight of lead present in a measured volume of air by a spot-test color comparison. A real advantage of this device is that it permits frequent checks of suspected areas with little expenditure of time. Where it is desired to have greater accuracy of air analysis or to sample the air during a certain period, it is necessary to use the more laborious method of collecting a sample by impinger, electrostatic precipitator, or filter methods and subsequent laboratory analysis with the chemical dithizone method or the polarograph.

Grab sample detector tubes have been developed for a considerable number of gases and vapors by Drägerwerk in Lübeck, Germany. A hand operated bellows is provided as the aspirating device rather than a squeeze bulb. The scale is marked directly on the tube. Gases for which tubes are available include alcohol, ammonia, arsine, benzene, benzene-toluene in two ranges of concentrations, carbon dioxide in two ranges, carbon disulfide in two ranges, carbon monoxide in two ranges, chlorine, aliphatic

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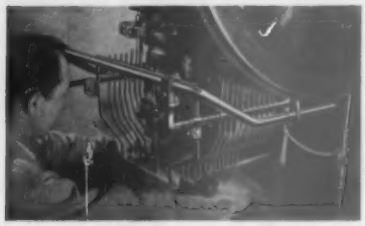

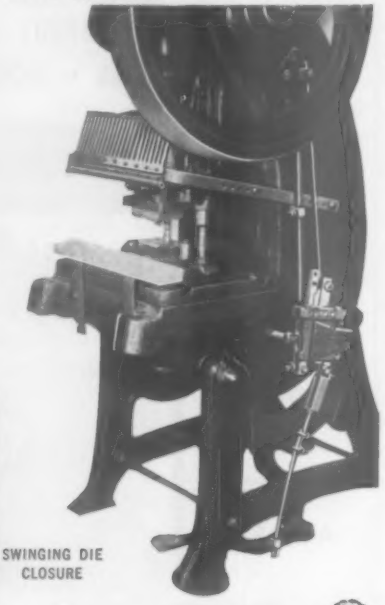

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hydrocarbons, hydrogen sulfide, mercury vapor, nitrous gases, phosgene, hydrogen cyanide, sulfur dioxide, trichloroethylene and other halogen hydrocarbons, and water vapor.

The Uni-jet device has been incorporated in a lead-in-air analyzer kit which includes three reagents permitting determination of lead by the dithizone method. A detailed account of this kit, together with the procedure, has been published by Dowling et al.,[7] who have applied the unit to the determination of lead tetraethyl in air in leaded gasoline tanks at refineries. The assembly is also applicable to other lead-in-air exposures. This is not a grab sample instrument to be operated by an untrained operator but is included in this section as the determination can be completed in the field. For reliable results it is to be emphasized that the procedure be conducted precisely as outlined by the authors.

Direct Reading Devices

There is much advantage in direct reading devices. Where it is possible to know the concentration of a deleterious material at the time the test is being made, various changes in operations can be instituted and further checks made to determine which of these are most effective. The direct reading devices in some cases give an indication on a milliammeter which must be translated into concentrations of contaminants by referral to a graph. With other instruments the dial is calibrated directly in parts per million.

Where the method of indication causes a flow of electrical current, an alarm or continuous recorder can be included. The recording instruments may be connected to a multiple location sampling system so that periodically the instrument will sample through a series of locations with a recording of the concentration at each station. Such a system may also be connected to an alarm system with a light to indicate the location of the high concentration. Ventilation fans may be actuated by the fluctuations in contaminant concentration.

Heat of Combustion Instruments. The heat of combustion of flammable gases and vapors indicates their concentration in two types of instruments. One of these is the MSA carbon monoxide detector. The hot junctions of a thermopile are surrounded by active hopcalite, a catalyst which causes oxidation of carbon monoxide with production of heat. The increase in temperature of the thermopile junctions causes flow of current which is indicated on a milliammeter calibrated directly in hundredths of a per cent.

The second type of instrument depending on heat of combustion uses a Wheatstone bridge. On one leg of the bridge is a cell containing a filament of platinum wire heated to a red glow. The bridge is ad-

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justed to a zero reading, and the air to be tested is drawn through the cell. Increase in temperature of the filament by the catalytic combustion of the gas causes a corresponding increase in the resistance of the filament. The degree of unbalance of the bridge is indicated on the milliammeter scale in terms of the per cent of the lower explosive limit of the gas. Only those instruments of this type which have a scale reading from 0 to 10 per cent of the lower explosive limit are of much value in making tests of health hazards, and even these are not as sensitive as might be desired for the more toxic vapors.

Electrical Conductivity Instruments. A number of gases found in industrial atmospheres will increase the electrical conductivity of a solution. Other gases or vapors may be burned to form compounds which ionize in water. This principle is the basis of a number of instruments for continuous indication of concentration of such gases and vapors and, where desired, may include an alarm or a continuous recorder.

Among the earliest instruments operating on this principle is the Thomas Autometer designed for continuous recording of sulfur dioxide in air. This instrument has been applied mostly to air pollution studies.

For in-plant operations, the Davis continuous electro-conductivity analyzer has found much application. This instrument has been used for sulfur dioxide and chlorine analysis in air pollution, for checking leak detection in operations involving carbon tetrachloride, for hydrogen sulfide and nitrogen dioxide gases and in solvent recovery operations in determining the cycling time for such solvents as methylene chloride.

Thermal Conductivity Instruments. Different gases and vapors have varying thermal conductivities. By passing air containing a gas through a cell containing a heated filament in one leg of a balanced Wheatstone bridge, the temperature of the filament will change as its heat is conducted to the cell wall at a changed rate. The resulting change in resistance of the filament causes unbalance of the bridge indicated on the milliammeter. This must be calibrated for the gas being tested.

This instrument may be applied to flammable as well as non-flammable gases. However, it is not applicable to gases, such as carbon monoxide, having a thermal conductivity close to that of air. The instrument developed by the Gow-Mac Instrument Company has been used in the determination of such contaminants as methyl bromide, methane, hydrogen, carbon dioxide, and organic vapors in air.

Radiant Energy Absorption Units. The property of a gas or vapor to absorb radiation of various wave lengths is the principle utilized in a number of instruments. This system has been applied to the determination of mercury vapor in air. An ultraviolet radiation source is directed toward a phototube actu-

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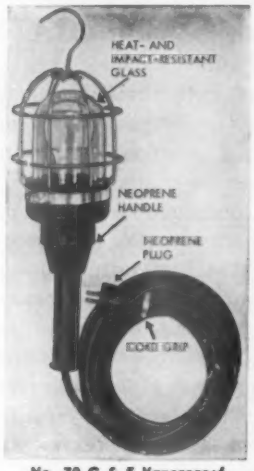

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ated by the ultraviolet radiation it receives. In one of the simpler of the units, produced by Kruger Instruments, the instrument is brought into the area where the test is to be made, and the room air between the ultraviolet source and the phototube will absorb the ultraviolet radiation in proportion to the amount of mercury vapor present. The smaller the amount of energy reaching the tube, the higher the concentration of mercury vapor.

In other instruments produced by Kruger Instruments and the General Electric Company, air is drawn through a cell interposed between the ultraviolet source and the phototube. This permits the use of a sampling tube in checking the concentration of mercury vapor at a point source. The first of these instruments has a range of 0.03 to 3 mg. per cubic meter of mercury vapor, reaching down to about one-third of the maximum acceptable concentration of mercury vapor of 0.1 mg. per cubic meter. Of the latter instruments, the General Electric instantaneous vapor detector has a range of 0.02 to 2.0 mg. per cubic meter and the Kruger instrument the two ranges of 0.005 to 0.1 and of 0.02 to 3 mg. per cubic meter.

These instruments will give a positive reading when any gas or vapor may be present which absorbs ultraviolet radiation. Among the gases and vapors which would interfere with the mercury vapor determination and could be detected by the instrument are benzene, toluene and xylene, perchloroethylene, trichlorethylene and sulfur dioxide. Among the compounds which do not absorb ultraviolet radiation sufficiently to respond are methylene chloride and carbon tetrachloride.

This principle has been combined with another phenomenon in the Taller and Cooper supersensitive analyzer. The first of two units contains activated mercuric oxide. Where such reducing gases as carbon monoxide, hydrogen sulfide, hydrogen, acetylene, and formaldehyde are passed through this unit,

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Goggles WR-50 have elastic headband, and are made as W-50 with plastic headrest. They are also made for grinding as types GR-50 and G-50.

Welding goggle BX has the same wide lens frame and lenses as the Unigoggle. Sold only with plastic headrest and cross strap, adjustable side protectors.

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the mercuric oxide is reduced to mercury. The unit is heated so the mercury in the form of a vapor passes through the second unit, an ultraviolet photometer. The mercury vapor is determined as in the instruments just described. This second unit can be used by itself as a mercury vapor indicator. It is sensitive to mercury vapor over the range of 0.005 mg. per cubic meter to 200 mg. per cubic meter. Its weight is 75 lbs., which does not make it too readily portable, though it can be used wherever a 110 a.c. power source is available.

The Davis Halide meter also operates through absorption of radiant energy by a phototube. Here the air is passed through a chamber containing an a.c. electric arc between a copper electrode and a platinum electrode. When a halide is present, a blue copper spectrum is produced, the intensity of which is proportional to the concentration of halide. This is picked up by a blue sensitive phototube with a blue glass filter. The change in current output of the phototube is indicated on the dial. The range is from 0 to 500 ppm. with a lower limit of about 10 ppm. The reading on the dial must be referred to a calibration curve for the halide being determined.

A new principle has been applied in an instrument for the determination of oxygen using a polarization cell. An important application of this instrument is in control of fire and explosion hazards, but it is also of use in determining whether a sufficient amount of oxygen may be present to sustain life, a determination which up to the present has largely been conducted by the venerable Wolf lamp. This new MSA portable oxygen indicator has a range of 0 to 25 per cent of oxygen by volume and is accurate to plus or minus one-half per cent oxygen.

Infrared Analyzers. Instead of using ultraviolet absorption, a number of instruments depend on the absorption by gases and vapors of infrared radiation. This instrument permits the continuous recording of gas concentrations and is exceedingly sensitive. We have been using two MSA Lira instruments and one Perkin and Elmer instrument for the recording of carbon monoxide concentrations. Our instruments have a range of 0 to 100 ppm. and give reliable readings of as little as 2 ppm. These devices with the recorders can be transported to the areas where the determinations are to be made, but the complete units weigh several hundred pounds.

Among other vapors for which the infrared analyzer may be used are methyl chloride, benzene, styrene, and vinyl chloride. The instrument is sensitized to a given gas or vapor. The operation of changing it to record another gas or vapor is a major undertaking.

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Noise Measuring Instruments

To determine the extent to which noise may be a hazard, a number of instruments are available. The simplest instrument is the sound level meter which determines the number of decibels. To determine noise levels at various frequencies, a frequency analyzer must be used. A peak noise indicator and equipment for calibration of instrumentation are also of importance.

Air Velocity Instruments

The instruments most used in industrial hygiene investigations for the determination of air velocities are the Alnor velometer, the heated thermocouple anemometer, the hot wire anemometer, and the Pitot tube. The velometer depends on the air current swinging a spring loaded vane. The instrument can be obtained with a number of calibrations and attachments. Convenient ranges for the instrument are 0 to 200 fpm. and 0 to 1000 fpm.

Jets are available which extend the instrument to appreciably higher velocity ranges. The Alnor Thermo-Anemometer uses a thermocouple and the Hastings Precision air meter a thermopile in a probe. The Anemotherm air meter utilizes a hot wire, the resistance of which depends on the extent to which it is cooled by the air current.

The Pitot tube measures velocity pressure in the air stream and must be used with a manometer, usually inclined to give greater precision. The air velocity in feet per minute must be calculated from the velocity pressure.

Conclusion. In this review, a number of general classifications are omitted, such as those used for studies of illumination and of ionizing radiation. Though a great number of instruments are now available, there continues to be room for further development. It is to be emphasized that whatever the instrument applied to the evaluation of an occupational health hazard, the results are only as good as the intelligent operation of the instrumentation and the competent interpretation of results obtained.

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Wisconsin's Goals

—From page 36

local safety councils and greater exchange of project data and program ideas.

John TePoorten, coordinator for vocational schools in the state, said a large industrial concern had recently underwritten the cost of producing excellent checklists in quantity on home, office, and school shop safety. He recommended a campaign to put these checklists into more hands.

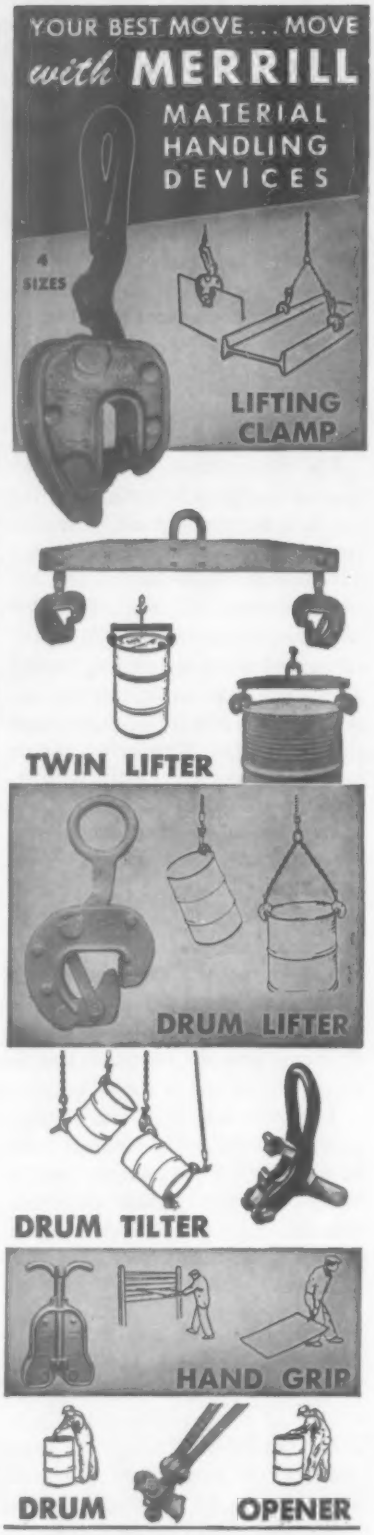
Clarence Greiber, director of the State Board of Vocational & Adult Education, said Wisconsin now has day-and-evening vocational schools in 41 cities and evening schools in 20 additional cities. Their programs are sufficiently flexible, he explained, to permit revisions of curricula to suit community and industrial needs, as those needs change. Vocational school instructors are active in local safety council work, often serving their turn as council officers and helping put on special programs.

Recent articles in NATIONAL SAFETY NEWS have underscored the need for more emphasis in safety research and training for engineers and others going on to college, preparing for careers in business and industry. Of 55 colleges and universities offering courses in industrial safety, only 10 offer degrees in this subject.

The University of Wisconsin, according to Paul Grogan, chairman of the Engineering Extension Department, offers three correspondence courses in this field—Industrial Safety Supervision, Industrial Safety Management, and Industrial Safety Engineering.

Clayton Orcutt, of the UW Management Institutes, reported that several two- to three-day institutes have been conducted for industrial safety personnel in recent years, but more executives have to be sold on the value of such training, if expansion in this field is to be attained.

The UW School of Education offers credit courses in general safety and driver education, but



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these courses are for teacher preparation, not for persons seeking careers in industry.

Walt Lindemann, of Hough Manufacturing Company and a W.C.S. vice-president heading the General Safety Division, said: "The accent in today's jet age is on speed—speed in travel, speed in production of goods, speed in services—but we'll have to recognize soon the need for instilling in people, starting with our children, a desire to survive—a will to live.

"We want to enjoy the advantages of our technology without having our lives cut short because of failure to understand and cope with the dangers involved in making industrial progress."

James Busch of the State Department of Public Instruction reported the department is at work on a curriculum-development guide covering safety education opportunities in elementary and secondary schools.

Dr. William Lea, director of industrial hygiene for the State Board of Health, commented on the solution of problems encountered during special studies in occupational health and safety at various Wisconsin industrial plants. Reports of these projects will be published in the W.C.S. monthly Safety Newsletter.

R. W. Gillette, W.C.S. executive director, mentioned that needs in occupational safety education were to be explored in a panel discussion during the 1959 Wisconsin Mid-Winter Safety Conference at Hotel Schroeder, Milwaukee, Jan. 22-23.

The 24 participants of the recent W.C.S. conference at Madison are planning to meet again in April, returning with reports on proposals by their organizations to improve industrial safety education in Wisconsin.

Doctor to patient: "Your blood pressure is normal, but for these times that's not so good."

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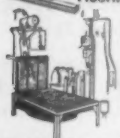
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Safety Library

—From page 58

include attribute listing, forced relationship techniques, checklists, morphological analysis, modification, free association, and Phillips 66 buzz sessions.

Chapter 21 lists a number of company programs, with a brief explanation of how each program operates. Chapter 22 outlines important considerations to be checked before installing a program. The final chapter discusses the future of creative thinking. In the words of the author, various factors should be considered in weighing the merits of such a program:

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" . . . Remember also that the production of a new idea is only one part of creative activity. The idea must be correctly evaluated, and then must be *implemented*. Most new ideas never reach the implementation stage, the reason for this being that implementation is often just plain hard work."

—L. C. SMITH

BOOKS AND PAMPHLETS

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Blasting

"Blasting Limestone Rock Asphalt

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Later." *Hospitals*. December 16, 1958. pp. 42-44.

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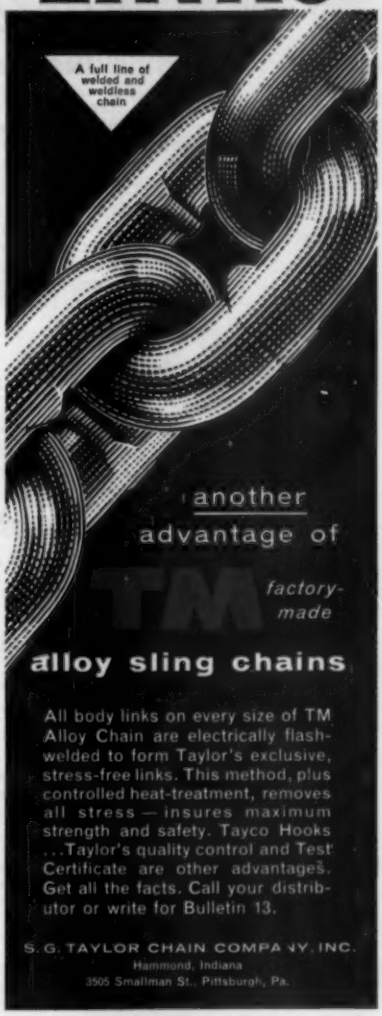

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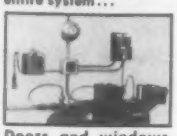

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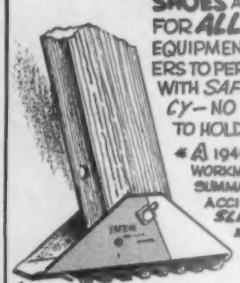

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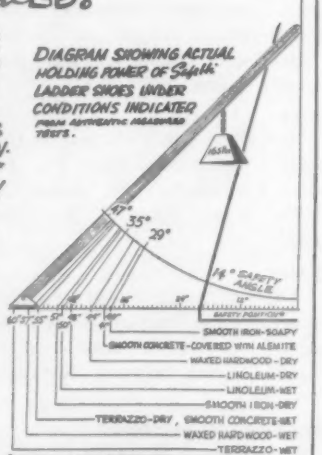

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Plant. December 1958. p. 48.

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ADDRESSES OF MAGAZINES MENTIONED

Readers are asked to send their requests for copies of magazine articles to the publishers. The NSC Library is unable to fill such orders.

AMA Archives of Industrial Health, 535 N. Dearborn St., Chicago 10.

Agricultural Chemicals, P.O. Box 31, Caldwell, N. J.

American Association of Industrial Nurses Journal, 654 Madison Ave., New York 21.

American Machinist, 330 W. 42nd St., New York 36.

British Journal of Industrial Medicine, Tavistock Square W.C. 1, London, England.

Coal Age, 330 W. 42nd St., New York 36.

The Edison Electric Institute Bulletin, 750 Third Ave., New York 17.

Elevator World, P.O. Box 1641, Mobile, Ala.

Engineering News-Record, 330 W. 42nd St., New York 36.

The Explosives Engineer, 613 Delaware Trust Bldg., Wilmington, Del.

Fire Engineering, 305 E. 45th St., New York 17.

Firemen, 60 Batterymarch St., Boston 10.

General Electric Review, Schenectady, N. Y.

Hospitals, 18 E. Division St., Chicago 10.

Industrial and Engineering Chemistry, 1155—16th St., N.W., Washington 6, D. C.

Industrial Medicine and Surgery, 605 N. Michigan Ave., Chicago 11.

Mechanical Contractor, Suite 570, 45 Rockefeller Plaza, New York 20.

Mental Hospitals, 1785 Mass. Ave., N.W., Washington 6, D. C.

Modern Sanitation and Building Maintenance, Powell Magazines, Inc., Easton, Pa.

Noise Control, 1278 Massachusetts Ave., Cambridge 38, Mass.

Occupational Safety and Health, International Labour Office, Geneva, Switzerland.

The Plant, Plant Publishing Co., St. Joseph, Mich.

Printing Magazine, 93 Worth St., New York 13.

Pulp and Paper Magazine of Canada, National Business Publications, Gardenville, Que., Canada.

Railway Age, Simmons-Boardman Co., Orange, Conn.

Refrigeration Service and Contracting, 433-435 N. Waller Ave., Chicago 44.

Research Trends, Cornell Aeronautical Laboratories, Inc., Buffalo 21, N. Y.

Space/Aeronautics, 205 E. 42nd St., New York 17.

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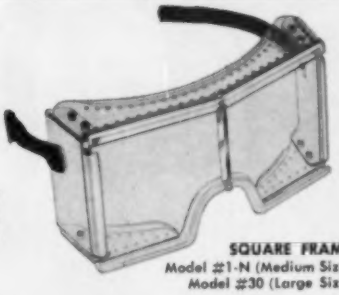

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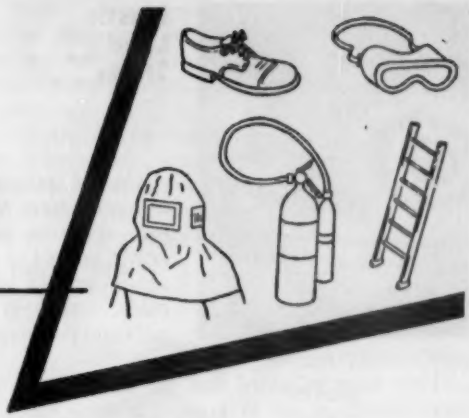

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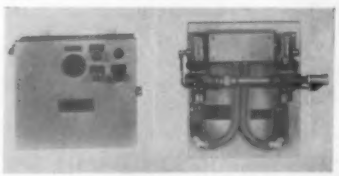

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It is suitable for use on presses, brakes, shears, indexing units and similar applications using an air-operated friction clutch and spring-set brake. The system uses two separate electrical, pneumatic and mechanical control circuits, operating in tandem.

According to the manufacturer, these are completely interlocked so failure of any one, or more than one, control component automatically stops the machine at once or at the end of the cycle. It also prevents the start of the next cycle until the fault is located and corrected.

The unit is built for use on new equipment and to be adapted to existing control installations.

Standard features include plug-in or standard industrial relays and cover mounted key-operated selector switch. Built-in relay test plug, relay test and multiple circuit test switches, safety lock-out relay, top-stop, timed inching are optional extras.

Textrol, Inc., 4015 Prospect Ave., Cleveland, Ohio (Item No. 302)

Safety Spectacles

A universal bridge, which will fit more than 95 per cent of employees without need of adjustment, is the unique feature of the Welsh "Unibridge" safety spectacles.

Time-consuming fitting adjustments can be eliminated, and inventory stock requirements reduced. The bridge blends comfortably to nose contours, and the modern butt-joint temple construction provides strength and fit.

The spectacles are available in three temple styles: spatula, metal paddle and comfort cable. There is a choice of copper, cordovan and pink crystal in the butyrate frame. The lens shape and construction is S7 square shape clear or green heat-treated glass and CR39 plastic. Eye size is available in 46 mm. and 48 mm.

Welsh Mfg. Co., 11 Magnolia Street, Providence 9, R. I. (Item No. 303)

For More Information—Circle Item Number on Reader Service Postcard

Plastic Load Slings

Use of plastic ropes fashioned from Mylar as load slings in industrial hoists, instead of conventional manila or steel cable, results in economies and improved workmen's safety records.

Tests have indicated that the plastic rope has outworn manila at a 6 to 1 ratio, and the slings are not subject to the load-caused kinks or sets which make steel cable difficult and time-consuming to use. Also, minor in-plant accidents caused by workmen cutting their hands on broken threads in steel slings has been eliminated.

Mylar does not scratch the plastic and steel coil stock constantly being hoisted by the slings.

Additional advantages of the ropes include dieletric properties enabling it to be passed over *hot* power lines without danger of shorting, and a total imperviousness to almost all types of acid and metallic corrosion that make it suitable for chemical plant use.

U. S. Plastic Rope, Inc. 2581 Spring St., Redwood City, Calif. (Item No. 304)

Electric Cap Lamp

The new Wheat Lamp provides 30 per cent more light than previous models and with no increase in weight. They are designed for the mining industry. The battery design and a new krypton gas-filled bulb with two equal-working filaments are responsible for the increase in light output.

A perfect spot can be made with either filament, as the focussing is done instantly without tools. By rotating the switch knob, the reflector moves to the best position for the desired focus of the light beam. The filaments are crossed and centered on the long axis of the bulb.

The battery has a double-sleeve, multi-tube positive plate construction, permitting greater volume of active material per tube and greater accessibility of the electrolyte to the material. This provides higher capacity for brighter light, without increasing battery size. The battery also includes improvements which increase resistance to vibration and hard use.

The headpiece design also is new, and the cord now passes over the crown of the protective cap for better balance.

National Mine Service Co., 2530 Koppers Bldg., Pittsburgh 19, Pa. (Item No. 305)

Mouth-To-Mask Resuscitator

This resuscitator is said to be a new concept for safer, more effective manual resuscitation. It may be used for first aid in toxic gas inhalation, asphyxia, electrical shock, inhaled industrial solvents and where breathing is impaired.

An automatic pressure limiting valve prevents pressures greater than 14 mm. of mercury, protecting the lungs of the smallest patients.

At no time is the patient's breath inhaled by the operator. Physically separated from the patient, the operator can observe chest movement and lip color without interrupting the rythm of resuscitation.

A rebreathing system prevents hyper-ventilation of the operator. The resuscitator can be used by one operator continuously for long periods.

The complete unit includes the resuscitator, transparent face piece, aspirator, airway and carrying bag. The complete kit weighs 2 lbs., 3 ozs. Air exchange in excess of 1000 ml. is easily accomplished.

Globe Industries, Inc., Medical & Hospital Dept. 125 Sunrise Place, Dayton 7, Ohio (Item No. 306)

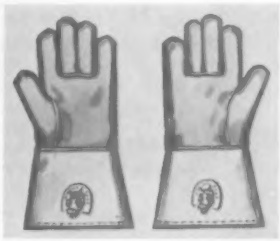
Lint-Free Garments

In industries where lint-free conditions are essential, this new line of lint-free 100 per cent DuPont Dacron will be effective.

Garments made of lint-free, acid-resistant fabric are designed with extra-high necks and with adjustable sleeve and pants cuffs for head-to-toe coverage. Rounding out the uniforms are lint-free Dacron full caps, caps with capes and lint-free nylon shoe covers.

Acid and chemical-resistant apparel of 100 per cent Du Pont Dacron, including shirts, pants, laboratory coats and coveralls, is also available. The fabric resists damage from exposure to various acids, alkalis, solvents, caustics and other chemicals.

Worklon, Inc., 253 West 28th St., New York 1, N. Y. (Item No. 307)

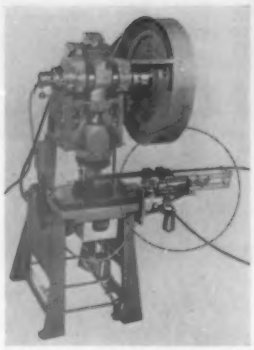


Reversible Welder's Glove

The front and back of this glove are identical in pattern, and there are no exposed seams on either side. The glove fits with equal comfort and feel on either hand.

Soft, flexible heat-resistant genuine horseside has been used in the brown and green glove. It is called the "Singer-Solo," and the glove comes packed singly, which means it can be ordered three at a time instead of a pair. The manufacturer states that in actual tests three single gloves have lasted as long as two or three pairs of ordinary welder's gloves.

Singer Glove Mfg. Co., 860 W. Wood St., Chicago 22, Ill. (Item No. 308)



Air-Operated Stock Feed Unit

Hand-fed punch press jobs can be profitably converted to safe, faster automatic feeding with this portable air-operated stock feed unit. The unit incorporates a Micro-Valve Control and can be mounted in minutes without links or rods.

Four standard sizes are available for most hand-fed punch presses. The feed is air-operated. There are no solenoids. No electrical connections are required. The unit will boost output and cut operating costs on short-run, strip stock feeding jobs, and when coil stock is used. Rejects are reduced, as uniform accuracy is maintained. Die breakage is almost eliminated, operator safety improved, and fatigue minimized.

Stock grippers are opened for instant loading and aligning of stock through the guide by the micro-valve. This stock is inserted easily, so strip and coil stock can be fed efficiently.

With the ease of application, automatic feeding becomes practical for press operations where slow, laborious hand-feeding is normally used.

Cleveland Pneumatic Industries, Inc., 64 Old Orchard, Skokie, Ill. (Item No. 309)

Pole Pul-Bar

The new Pole-Pul-Bar has features that offer service with safety.

The single step action jack principle tightens two premium preformed wire ropes evenly and tightly around a pole with a positive locking action, securing the lead pole for safe load transportation. It is designed to pull dollies and dinkies with brakes. The extra-heavy Pul-Bar will withstand the shock and jerk of instant stops and starts. The unit features extra-heavy steel construction, premium performed wire rope, single step action jack, 9/16-in. pins that make a safe and positive cable lock, stub chain for the binder, steel pole bumper, and a relatively light weight of 77 lbs.

Hoff & Davis Tool Designing & Mfg., 2590 E. 67th St., Long Beach, Calif. (Item No. 310)

Portable Public Address System

The "Ranger" transistorized portable public address megaphone weighs 3 lbs. and is equipped with a pistol grip for one-hand operation. The unit is powered by six self-contained, easily replaceable penlight batteries. No plug-in to an electric light socket is necessary.

The "ranger" is designed for directing traffic and emergencies on streets and highways. It cuts through the noise in construction areas and provides light, portable long-distance communication equipment at fire and disaster.

As a training aid for safety and security work, it is effective. It is durable, weatherproof and reliable, and has an adjustable volume control. Each unit is equipped with the new rubber safety mouth guard that prevents injury to the face and teeth.

Antrex Corp., 856 N. Rockwell St., Chicago 22, Ill., (Item No. 311)

Safety Step Tread

A non-skid, metal-backed safety step tread is now available for commercial buildings, factories, theaters and institutions. Other suggested uses include steps on trucks, construction equipment, chemical and food-processing plants, mills and machine shops. Primarily designed to prevent slips and falls through its non-skid, anti-slip features, the plate features "two-zone" construction. The lip and edge contain a high percentage of live rubber that helps prevent shattered shinbone accidents and withstands gouging by sharp heels.

The tread is made from synthetic Rub-Bub compound that resists abrasion. Compounds have sure-footed textures, and are integrally molded and double-bonded to punched metal backing. Non-skid wet or dry, the step plate also offers increased safety, because small squeegee ribs grip shoe soles tightly while water tracked on the step tread drains off through the deep grooves.

The steps are available in various sizes, and can be installed on new concrete steps, old concrete steps, or on metal steps by conventional screws or bolts.

Samuel Moore & Co., Flooring Prod. Div. Mantua, Ohio, (Item No. 312)

Herbicide

Atrazine 50W Herbicide for non-selective or industrial weed control on non-cropped land controls annual broadleaf weeds and grasses and many perennial weeds. It may be applied not only before weeds emerge, but also within several weeks after weed emergence.

The product is effective from late spring through early summer, is low in toxicity to man and animals, and does not require the use of special protective clothing. It is non-flammable, low in electrical conductivity, non-corrosive and easily flushed from sprayer equipment with water. It will be useful in controlling weeds presenting fire hazards.

Geigy Chemical Corp., P. O. Box 430 Yonkers, N. Y. (Item No. 313)

Flooring Material

A new flooring material that can withstand up to 50 per cent inorganic acid conditions without corroding is available in smooth or non-skid finish.

"Stonclad" will withstand hot concentrated alkaline solutions up to 170 degrees and nitric acid up to 15 per cent. The main feature is its ability to resist corrosion damage from acids and alkalies, and at the same time stand up under heavy traffic.

Synthetic resins are used together in such a way that a macropolymer or "chain strength" product is achieved. A new installation may be used for foot and light truck traffic after five hours. No special floor preparation is required. Simple cleaning is usually sufficient preparation before application of the product over the old surface.

"Stonclad" is available in tile red and medium grey.

Stonhard Co., Inc. Dept. 134, 1304 Spring Garden St., Philadelphia 23, Pa. (Item 314)

Snap-On Signs

These signs can be used for safety messages and programs. White plastic channel boards with red, blue, green or black borders feature six channels accommodating 15 two-inch embossed snap-on letters in red, blue, green or black. The boards measure 24 in. by 19 in.

Art work, layout and samples on special designs and coloring will be furnished. The letters and boards are available in kits or individually.

Ad-O-Plastic, P. O. Box 474, Woodbridge, N. J. (Item No. 315)

Magnetic Transfer System

A new magnetic transfer system, the AAC Automatic Hand, now makes it possible to automate transfer and removal of many parts previously handled manually. It is intended primarily for handling large parts, as well as those that cannot be handled mechanically without damage. It is useful with preses, roll forming machines, press brakes, hydraulic presses, shears, welding equipment, and similar equipment.

The Automatic Hand will automate a line, starting with sheared blanks and feeding and removing them from fabricating machines until the part is complete. Electro magnets and electromagnetic rollers are basic to the system. These magnets pick up the piece to be transferred and move it to the next station, where a switch is tripped, releasing the piece. The piece may then be picked up by another magnet for further transfer, fed into another fabricating unit, or stacked, as the operation requires.

By automating such operations as removing blanks from a press, transferring and feeding to another press, use of these new units reduced many safety hazards. Production and output of capital equipment are increased, and personnel is freed for other work.

American Actuator Corp., Box 384, Stamford, Conn. (Item No. 316)

Sound Barrier

An earphone, particularly useful in noisy industrial applications and in flight communication systems, is the #260 Sound Barrier. The unit consists of a speaker boom and earphones built into ear-muff type hearing protectors. The unit fits on the head to allow freedom of both hands. Noises are deadened, allowing quiet communication and more audible transmission.

Willson Products Div., Ray-O-Vac Co., Reading, Pa. (Item No. 317)

Explosionproof Panel Heater

This heater has been approved by UL for certain hazardous areas. Model RX-5,500 w. heater, may be used in Class 1, Group D, Petroleum Products, and in Class 1, Group C, Ethyl Ether Vapor, where the temperature limit is 356 degrees. Model RX-10, 1000 w. heaters may be used in Class 1, Group D, Petroleum Products, where the temperature limit is 536 degrees. The heaters are suitable for hot desert or low arctic temperature applications.

Features of these heaters include radiation fans of cast aluminum, which provide a free flow of heated air. Hot resistor wires are insulated and imbedded within the finned aluminum casting. Deflector channels force the heat outward, providing secondary air flow. A heat shield and rear panel prevent scorching of walls, and engineered joints and the terminal box resist high pressures. The heaters have an external conduit box with a unit for connecting the power service. A nickel-plated grille guards the heating panel.

Commercial Controls Corp., Electromode Div., 570 Culver Road Rochester 3, N. Y. (Item No. 318)

Fire-Fighting Lift Truck

This low lift platform truck doubles as a production tool and as mobile fire-fighting equipment.

Key to the system, developed by the manufacturer for use in his own plant, is a fire-fighting unit mounted on a skid. The economical device carries carbon dioxide and dry chemical fire-fighting systems, as well as a small tank of water and auxiliary hose for connection to local outlets.

In emergencies the truck picks up the skid and carries it to the location where it is needed. The truck designed for handling the fire-fighting unit is a standard 66 in. platform Worksaver with a 24 v. electrical system permitting speeds up to 10 mph. The highly maneuverable truck will operate in narrow aisles and low headroom areas and other places where standard fire fighting equipment could not operate.

The Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia 15, Pa. (Item No. 319)

Emergency Oxygen Unit

This dependable emergency medical oxygen unit has a standard "D" cylinder containing 360 liters of oxygen, sufficient for one hour. When empty it may be exchanged or refilled.

The light, handy unit is easily carried, and can be used immediately in an emergency requiring the administration of oxygen. It is adaptable for industrial plants and offices.

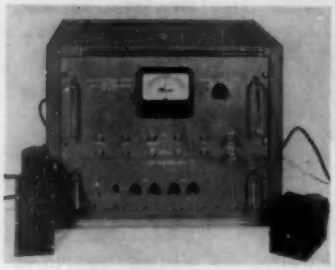
Montbell Products Corp., 7435 N. Western Ave., Chicago 45, Ill. (Item No. 320)

Swing-Top Lids

Convert-A-Drum Swing-top lids quickly convert empty 15, 30- and 55-gal. capacity drums into efficient, safe, sanitary, attractive waste receptacles. The lids are made of fire-resistant heavy steel, each containing two free-swinging doors with rustproof, baked green enamel finish.

The lids are attached in a few seconds to any standard drums. The lids are available as individual units, or as part of a kit including one swing-top lid, a can of decorative instant-dry spray-on, and one easy-on burlap bag that hooks inside the drum to prevent corrosive action of waste and to make disposal easier.

General Scientific Equip. Co., Limekiln Pike & Williams Ave., Philadelphia, Pa. (Item No. 321)



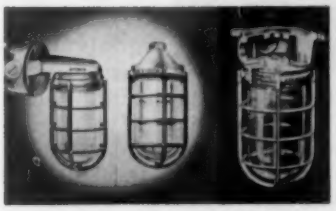
Electrostatic Voltmeter

This voltmeter can measure the voltage of an electrostatically charged surface without touching it.

The equipment can be mounted wherever static is suspected, and its presence not only established but actually measured. Measurements are made without contact of probe to the surface, and results are relatively independent of the distance from the probe to the surface being measured. Suggested fields of application include manufacturers of sheet plastic materials, paper manufacturers, synthetic textiles, hospital surgery, petro-chemical operations, atomic energy and mining operations.

A portable type instrument operating on the same principle is also available for use where the probe can be located close to the surface measured. The instrument can be used as a visible indicator of the relative danger of the charge of static accumulations. This would be valuable in surgery, oxygen therapy and the manufacture of explosives.

Monroe Electronic Laboratories, Inc. Middleport, N. Y. (Item No. 322)



Vaportight Lighting Fixtures

These fixtures protect lamps and lighting installations from premature failures caused by seeping moisture, rain, ice, corrosive fumes or non-explosive vapors and gases. Pendant, ceiling and wall types in sizes up to 200 w. are available and are all fully UL-approved and CSA-approved for vaportight service.

Each fixture is individually packaged with components and accessories for quick, easy-on-the-job installation. Components are heavy-duty, rustproof, corrosion-resistant, high-purity aluminum, precision die cast for uniformity and interchangeability throughout the line.

The units weigh less, have fewer parts, are easier to install, and provide years of trouble-free service where moisture and the elements are damaging to other units. The line is effective in processing areas, cold storage and meat packing plants, breweries, foundries, loading docks and platforms, and other exposed or damp locations.

Stonco Electric Products Co., 333 Monroe Ave., Kenilworth, N. J. (Item No. 323)

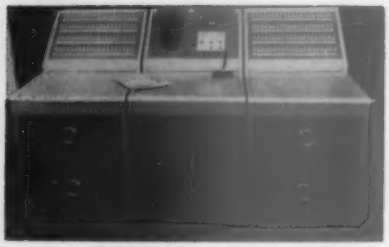
Plastic-Coated Glove

Greater ease of finger movement, added comfort and protection are provided by this all-purpose plastic-coated glove.

Featuring box-tipped fingers, curved to fit each finger of the hand, the gloves provide the dexterity of an "extra set of finger nails" in handling small parts. The glove fingers do not hug the hand but allow free air circulation, when the hand is flexed.

Available with plastic coating on the entire glove or on the palm only, the box-tipped model is liquid-proof and resistant to most acids and other chemicals. This glove is warm and long wearing and is available in knit wrist, band-top or gauntlet styles for men and women.

Advance Glove Mfg. Co., 902 W. LaFayette Blvd., Detroit 26, Mich. (Item No. 324)



Fire Protection System

The Phon-O-Matic fire protection system provides coded and recorded fire and security signals successive and non-interfering with the additional advantage of phone communication.

Independent police and compulsory watchman reporting is secondary to fire reporting. Centralized control equipment eliminates 95 per cent of field maintenance. A plug-in design assures quick repair and continuous service. Recall and remote signal-light control from headquarters, as well as full voice recording, are optional.

Notifier Corp., Lincoln, Nebr. (Item No. 325)

Fire-Retardant Floor Tile

Koroseal vinyl asbestos floor tiling offers extra safety for flooring. The product was developed to meet such specifications as Military Specification MIL-T-18830.

The high degree of fire safety, decorative utility, durability, comfort, permanence, service, and light weight make it useful for ships, hospitals, commercial and institutional buildings.

The product does not support combustion and is fortified for fire-resistance. The elimination of extra surface finishes, and the special composition afford double anti-slip protection.

This floor tiling can be installed on practically any smooth, dry and rigid interior floor, including concrete, wood, marble, steel and composition floors.

B. F. Goodrich Co., Flooring Products, Watertown 72, Mass. (Item No. 326)

Saw Safety Guard

A power see-through saw guard approved by the New York State Department of Labor, gives protection in the operation of any conventional table saw with blades from 6 to 16 in. in diameter.

A transparent shield of shatter-resistant Plexiglas covers the saw, allowing vision and accuracy in various operations. By a flick of the knob, the guard is set into any of three operating positions in extension plates attached to the table top.

Capable of providing horizontal and vertical pressure, the guard can be used as an over-riding fence for angular work. It prevents physical contact with the blade and resists displacement while in use.

A special feature is the non-fouling, spring-loaded, anti-kickback device built into the shield to increase operator protection. It is designed to dig into the stock in case of a "force back."

Brett-Guard Corp., 3611 14 Ave., Brooklyn 18, N. Y., (Item No. 327)

Bottle-Crusher

Disposing of rejected or broken bottles is now safely possible with this bottle crusher. The unit features an enclosed motor, impervious to the water necessary to wash down equipment.

The extra-heavy castings will withstand the terrific impact of heavy glass bottles because the impellor or glass breaker is made of 30 per cent carbon steel and is guaranteed not to bend or break under extreme usage.

The bottle crusher will be useful for bottlers, food packers, drug, cosmetic and sundry manufacturers, restaurants and hotels, or wherever quantities of unwanted glass must be safely and economically disposed of.

The unit is powered by a ¼ hp. motor, and accepts bottles and other glass objects up to 5 in. in diameter.

Rescor Industries, 18 W. Broad St., Mount Vernon, N. Y., (Item No. 328)

Fork Truck for Hazardous Locations

A walkie fork truck designed to meet UL explosion-proof specifications is built for maximum safety in severely hazardous locations. The truck design will permit mechanized handling in refineries, paint and chemical plants, mines and other installations, where vapors and fumes are present in explosive quantities.

This truck is designed to meet UL type EX-Class 1-Group D explosionproof, specifications and is available on counterbalanced fork trucks.

Aside from special wiring and battery arrangements used, explosionproof trucks are the same as standard models, except for a minor increase in over-all length to accommodate the battery arrangement. Switches, motors and wiring are sealed in conduits or explosionproof fixtures. The battery arrangement permits flexible speed control without using heat-producing resistance boxes. Like other electrical equipment on the truck, the battery is sealed to prevent a spark setting off an explosion.

Moto-Truc Co., 1954 E. 59th St., Cleveland 3, Ohio, (Item No. 329)

Radar Detector

A high-intensity radar beam detector that fits in a shirt pocket warns engineers and technicians when they are in a dangerous radar beam.

The Microwave Radiation Detector has a neon light and an earphone. Both give ample warning to personnel before exposure to the dangerous radar beams, which can become a critical health hazard. The intensity of the sound in the earphone is governed by the nearness of the individual to the radar transmitter. Operating at all frequencies, it will detect a powerful operating radar one-half mile away. It is also a useful tool for locating leaky wave-guide joints.

Erickson Products Co., 1960 Carroll Ave., San Francisco 24, Calif. (Item No. 330)

For More Information—Circle Item Number on Reader Service Postcard

NEWS ITEMS

B. F. Goodrich Footwear & Flooring Co.

John L. Baier, John M. Burns and V. J. Reed have been appointed sales representatives for Industrial Footwear and Glove Sales.

Mr. Baier, the Northeast sales representative, has been with the company since 1949 and has served as a time study engineer and sales service supervisor.

J. L. Baier

J. M. Burns

Mr. Burns, who will cover the Mid-Atlantic sales territory, started with the company in 1936 and has been a credit and operating manager in Pittsburgh and Philadelphia.

V. J. Reed has been manager of the West Coast District Footwear Division of the Hood Rubber Co. and will represent the company on the West Coast. He has been connected with the shoe industry for many years.

V. J. Reed

Glendale Optical Co., Inc.

This Valley Stream, N.Y., manufacturer of head and eye protective equipment has announced the appointment of Fibre-Metal Midwest, Inc., Bridgeview, Ill., as exclusive warehouse distributor to service dealers in several midwestern states. Fibre-Metal Midwest is the fourth warehouse distributor appointed by Glendale in 1958.

* * * *

Dick Anderson

Ansul Chemical Co.

Levitt-Safety, Ltd., will now distribute dry chemical fire equipment for the Dominion of Canada.

The company headquarters are at 747 Vaughan Road, Toronto. The manager for the new western region is Dick Anderson, whose office will be in Edmonton, Alberta. From his previous base in Winnipeg, Mr. Anderson has managed sales in northwestern Ontario and Manitoba for Levitt since 1952.

In addition to Edmonton, the company has established two other offices for the western region. The new office has been established in Calgary, and the firm is also represented in Regina and Vancouver.

NEWS ITEMS

(Continued)

Crouse-Hinds Co.

George B. Jamison has been named divisional manager for the Gulf Division of this manufacturer of cast electrical conduit fittings, airport lighting equipment, floodlights and traffic control equipment.

His headquarters will be in Houston, Texas, and he will head the division which includes the Houston region. He has been with the company since 1944, and has considerable experience in electrical engineering.

The company also has appointed William R. Major, Jr., as divisional manager of the Southeast Division. He will be headquartered in Atlanta, Georgia, and cover several southern states. He has been with the company since 1946, transferring in August, 1958, from San Francisco, where he was a regional manager.

* * * *

Riggs Nucleonics Corp.

Harvey Riggs, president, has announced the appointment of several representatives to handle the firm's monitoring devices. Representatives are as follows:

Edward E. Barr, 6434 Bradford St., San Diego 15, Calif.

John B. Lightstone, 100 Ostrom Ave., Syracuse, N. Y.

Long & Associates, 1210 Centerbury Drive, Burlingame, Calif.

C. W. Reed Co., Inc., 5959 S. Hoover Street, Los Angeles 44, Calif.

Gene French Co., 120 San Pedro Drive, S. E., Albuquerque, N. M.

S. and S. Associates, 10 DeKalb St., Norristown, Pa.

* * * *

Iron Age Safety Shoe Div. H. Childs & Co., Inc.

Donald A. Waples has been appointed Sales Representative in the Michigan area. He formerly was with the Cadillac Division of General Motors Corp. His headquarters will be in Royal Oak, Mich.

The company also appointed David L. Hughes as representative in Texas, Oklahoma and part of Louisiana. Mr. Hughes has been in the safety equipment business since 1949 and will have headquarters in Houston, Texas.

Chicago Hardware Foundry Co.

This North Chicago, Illinois, manufacturer has announced the appointment of Foster W. Lamb as General Sales Manager for all of the company's foundry sales divisions, including welding rods, ferrous and non-ferrous castings, Sani-Dri Automatic Hot Air Dryers and Sani-Products Chairs, Stools and Tables.

Mr. Lamb has been with the Automatic Transportation Company, Templeton Kenly & Co., and The Colorado Fuel and Iron Corp.

* * * *

Olympic Glove Co., Inc.

Calolympic Glove Company, Riverside, Calif., has been established as the west coast affiliate of this New York glove manufacturer. The affiliate will service the Greater Los Angeles area and the West Coast and Mountain states.

* * * *

Tect, Inc.

William H. Koop has been appointed General Sales Manager with the responsibility for the distribution of the company's line of safety solvents and detergents throughout the United States and Canada.

Prior to his affiliation with the Northvale, N. J., organization, he was with the George S. May Company and the Western Chemical Company, also the Buitoni Foods Corp.

* * * *

The Gamewell Co.

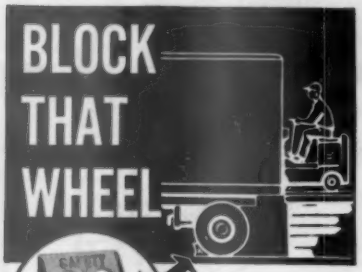
W. Ben Flanigin has been appointed general sales manager of The Gamewell Co., Newton Upper Falls, Mass.

Mr. Flanigin, who joined the company in 1946 moves up from the position of sales manager of the company's Eastern Divisions.

All product sales divisions will be under Mr. Flanigin's supervision, including: municipal sales, industrial sales and potentiometer sales. The sales managers are Robert B. Allen, Bernard H. Breedlove and Charles J. Manning respectively.

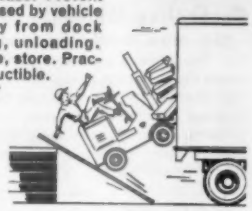
Circle Item No. 82—Reader Service Card

BLOCK THAT WHEEL



. . . and PREVENT THIS!

Safety Wheel Blocks are light, strong, tough because they're STEEL CASTINGS. Hold heavy trucks, trailers with ease. Prevent accidents caused by vehicle moving away from dock while loading, unloading. Easy to handle, store. Practically indestructible. Stocked for Immediate Delivery



$10.95 ea. 1-5 Blocks

$9.95 ea. 6 or more F.O.B. Hammond, Ind.

Order now for immediate delivery! Write for illustrated catalog.

CALUMET STEEL CASTINGS CORP.
1638 SUMMER STREET • HAMMOND, INDIANA

GETS-A-LITE GUARD and GUIDE

Quickly and Easily Installed by Anyone—No Tools Needed!

- Simply slip GETS-A-LITE GUARD AND GUIDE over the fixture, as illustrated.
- Made of indestructible spring steel wire. Nothing to break, get out of order or replace. Will last indefinitely.
- Once installed, GETS-A-LITE GUARD AND GUIDE is NEVER removed.
- Nothing to unlock, fuss with or lock, when changing lamps.
- GETS-A-LITE GUARD AND GUIDE actually steers lamp into socket, enabling maintenance man to change lamp in 10 seconds!
- Available for 40 watt and 100 watt fluorescent lamps.

GETS-A-LITE CO.—Dept. NSN-19
3865 N. Milwaukee Ave., Chicago 41, Ill.

Circle Item No. 75—Reader Service Card

Calendar Contest

—From page 96

ber), Salt Lake City, Utah.

Miss Margaret A. Porter (Individual Member), Houston, Pa.

Mrs. W. R. Mitcham, Sandia Corporation, Albuquerque, N.M.

Miss Mary Allard, Lackland Air Force Base, Texas.

Miss Gwen Hansen Concordant Publishing Co., Saugus, Calif.

Mrs. A. L. Horton (Individual Member). Coos Bay, Ore.

Earl Whitehead, Northern Illinois University, DeKalb, Ill.

Mrs. Dorothy E. Gannon, Rock Island Railway, St. Louis, Mo.

Charles Lawrence (Individual Member), St. Petersburg, Fla.

Mrs. Tina Principato (Individual Member), West Roxbury, Mass.

Fred L. Payne, Liberty Mutual Insurance Co., San Francisco, Calif.

Mrs. Clara B. Andrews (Individual Member), Abbeville, Ala.

Harold Ratcliff, Consumers Power Co., Jackson, Mich.

H. Lampon, Standard Oil Company of New Jersey, Elizabeth, N.J.

Mrs. Ann Lindsey (Individual Member), Yuma, Colo.

Russell Kinkle, Westinghouse Electric Mfg. Co., Lima, Ohio.

Mrs. Frank Basil, Atlantic Refining Co., Philadelphia.

Clarence Davis, Arizona Public Service Co., Red Rock, Ariz.

Mrs. Elizabeth L. Goerss, Republic Steel Corp., Lake Fleet Div., Cleveland, Ohio.

James J. Bohn, Anheuser-Busch Inc., St. Louis, Mo.

Ross F. Christensen, U. S. Post Office, Logan, Utah.

Mrs. Edwin Baeseman (Individual Member), Wausau, Wis.

Scott Boyd, Kennecott Copper Corp., Ray Mines Div., Hayden, Ariz.

Mrs. William L. Ryan, Tidewater Oil Co., Mount Alton, Pa.

Mrs. Adolph Cremer (Individual Member), Jefferson City, Mo.

J. E. Strader, Board of Education, Bath, S.D.

Paul Jason (Individual Member), New Bedford, Mass.

Marcus Schaeffer (Individual Member), Belleville, Ill.

Mrs. Fred A. Hasty, Jr., Koppers Company, Woodward, Ala.

Jean Berry (Individual Member) Sedalia, Mo.

Circle Item No. 76—Reader Service Card

be prepared with

Big Beam
AUTOMATIC EMERGENCY LIGHTS

Storage Battery Always Fully Charged—Built-in Charger

Just plug in a BIG BEAM Emergency Light and rest assured that when regular lights fail, your plant or building will be protected automatically with hours of bright, SAFE illumination. Variety of models available.

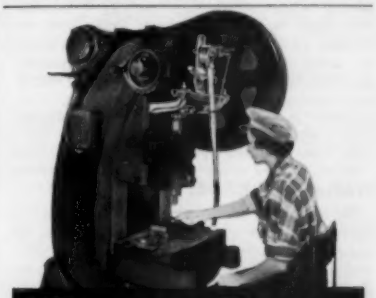
HAND LAMPS • FLARES

Wide range of hand lamps and flares also available, including Explosion-Proof Hand Lantern, Model 287EX for use in Hazardous Locations, Class 1, Group D, Approved by Underwriters' Laboratories.

Write for Bulletin on Complete Big Beam Line 7005

U-C-LITE MFG. CO. 1027 W. Hubbard St. Chicago 22, Ill.

Canada: Bernard Marks & Co., Ltd., 70 Claremont St., Toronto 3, Ont.



Power Press Guards

Protect Operators • Increase Production

Wiesman cam-action press guards enable operators to work at top speed without fear of accident. Guarding is effective and completely automatic . . . does not hamper operator's vision or movement. For all sizes and styles of presses. Used by hundreds of firms. Inexpensive . . . easy to install.

Over 30,000 sold

Write for descriptive folder and 30-day FREE trial offer.

Name_____

Address_____

Title_____

Wiesman Manufacturing Co.
31 South St. Clair Street • Dayton 2, Ohio

Circle Item No. 77—Reader Service Card

TRADE PUBLICATIONS

These trade publications will keep you up-to-the-minute on new developments in safety equipment and health products. All catalogs are free, and will be sent without obligation. Just circle publication number on the Reader Service Postcard.

Sling Chain:

The McKay Company offers a line of McK-Alloy Sling attachments. The catalog lists detailed single, double, triple and quadruple branch slings, as well as other types including Adjustable, Adjustable Loop, Basket and Endless Slings and illustrates each assembly. Also included are illustrations on Master Rings, Pear-Shaped, and Oblong Links. A completely new section is devoted to the use, care, safety and inspection of McK-Alloy Sling Chains. This section is extremely ample because it contains many do's and don'ts and suggestions on the best method for proper chain storage, cleaning, handling, etc. How to detect stretch and wear in chains, and the hazards of heat conditions, as well as other valuable information, provide a sound basis for proper chain maintenance. The McKay Company, 1005 Liberty Ave., Pittsburgh 22, Pennsylvania.

For more details circle No. 400 on enclosed return postal card.

Noise Simplified:

H. H. Scott, manufacturer of fine instruments for the measuring and analysis of sound, announces the release of a new edition of their popular booklet Noise Simplified, by Victor H. Pomper. This booklet contains useful, non-technical information, measurement, analysis, and control of sound. The pamphlet is designed to aid management in its efforts to protect employees from the possible harmful effects of uncontrolled noise. H. H. Scott, Inc., Maynard, Mass.

For more details circle No. 401 on enclosed return postal card.

Skullgards:

Highly resistant to impact and penetration and now available in colors for quick personnel identification are Skullgard hats and caps that are illustrated in a new brochure offered by Mine Safety Appliances Company, 201 N. Braddock Ave., Pittsburgh, Pa. Type "K" hat and Type "B" cap have almost unlimited applications in construction work, oil fields, mines, pit and quarry operations, chemical plants, steel mills and other industries. The Skullgards, featuring "fixed-crown" suspensions for proper clearance between head and shell, are available in nine colors—red, blue, white, yellow, black, gray, green, orange and brown. Bulletin—No. 0601-4 gives full details.

For more details circle No. 402 on enclosed return postal card.

"Guide to Ozalid Whiteprint Machines":

A new 16-page guide to Whiteprint equipment and the various applications is available from the Ozalid Division of General Aniline and Film Corporation, 25 Corliss Lane, Johnson City, New York. This graphic booklet includes product photos of the latest equipment and a list of complete specifications for each model. In addition, each model is fully described in terms of its particular advantages, applications and distinguishing features. Detailed data is furnished on the Bambino, Ozamatic, Streamliner and Printmaster.

For more details circle No. 403 on enclosed return postal card.

Heavy Duty Limit Switches:

Catalog 84 gives complete details of three types of Micro Switch heavy-duty limit switches for industrial uses—the plug-in "200LS" series, featuring quick replaceability; the compact "LS" series; and the rugged "ML" switches, available in regular or explosion-proof types. The catalog lists switches with a variety of contact arrangements for either direct or alternating-current applications. Several actuator designs in each switch-type are shown. Micro Switch Division of Minneapolis Honeywell Regulator Company, Freeport, Ill.

For more details circle No. 404 on enclosed return postal card.

Motor Driven Single Bridge Cranes:

A well-documented 8-page folder, Bulletin DH-445B, describes the Type B-514 Top Running, Single Bridge, Motor-Driven Cranes has been issued by the Wright Hoist Division, American Chain and Cable Company, Inc., York, Pa. Offered in capacities, with spans up to 50 feet, and in standard bridge travel speeds of 75, 125, and 175 FPM, these cranes are said to be satisfactory for all floor-controlled industrial applications. Features of construction such as end trucks; bridge beams, and truck connections; rail sweeps, axles, ring gears; tread wheels; drive units; controls; motor and electrical equipment; etc., including complete specifications, weights, capacities, and dimensions have been included.

For more details circle No. 405 on enclosed return postal card.

Protective Gloves:

The Mine Safety Appliances Company has available a new 8-page bulletin which contains a handy Selection Guide indicating the right glove to use for protection against 180 chemicals, oils, and gases. The bulletin also lists sizes, colors, weights and finishes of all M-S-A Molded Handwear. Mine Safety Appliances Company, 201 N. Braddock Ave., Pittsburgh 8, Pa.

For more details circle No. 406 on enclosed return postal card.

Dry Chemical Fluidization in Ansul "D" Models:

A new technical bulletin on dry chemical fluidization of Ansul "D" Model fire extinguishers is available from Ansul Chemical Company, Fire Equipment Division, Marinette, Wisconsin. The bulletin No. 36 explains why fresh-filled extinguishers out-perform units subjected to vibration and packing due to transportation and long storage. It also tells how Ansul achieved maximum fluidization by improving the gas tube design and by rearranging the location of the gas ports.

For more details circle No. 407 on enclosed return postal card.

Floodlights:

Crouse-Hinds announces a new Floodlight Catalog 320 (14 sections, 184 pages). Aim of the new Floodlight Catalog is to provide adequate descriptive and ordering information in clearly-presented form, with information easy to find and to use. Several sections are entirely new, such as the sections on Floodlights and "Mercury Vapor Floodlights"; other sections contain items formerly listed, plus additional new products. Section headings for the catalog are: Contents, How to Select Floodlights, Heavy Duty Floodlights, General Purpose Floodlights, Mercury Vapor Floodlights, Special Lighting Fixtures, Hazardous Area Lighting, Searchlights, Underwater Floodlights, Floodlight Poles, Accessories, Installation Suggestions, Calculations, etc. Crouse-Hinds Company, Syracuse 1, N. Y.

For more details circle No. 408 on enclosed return postal card.

Will Type Crane Electrification:

A new booklet has been issued by the Cleveland Crane and Engineering Co., Wickliffe, Ohio, covering Wall-Mounted

Inverted-Y Electrification. This electrification is designed for heavy service applications, such as mill-type overhead traveling cranes, ore bridges, etc. It consists of extruded aluminum conductor bars, support fittings and current collectors. The new booklet, called Electrification Booklet No. 2, pertains to wall-mounted electrification only, for current capacities ranging from 600 to 6,000 amperes continuous service.

For more details circle No. 409 on enclosed return postal card.

Pneumatic Conveying Systems:

New 16-page illustrated bulletin points out how pneumatic conveying systems can reduce plant operating costs and improve plant efficiency. Issued by The Day Company, 810 Third Ave., N. E., Minneapolis, Minnesota, this bulletin No. M-588, covers high density (fluidizing type) and low density conveying systems and equipment. Common installation arrangements are diagrammed. Photos show actual installations, basic equipment and accessories. Briefly describes Day Research, Testing, Engineering, Fabricating and Installation services.

For more details circle No. 410 on enclosed return postal card.

Wire Rope "Blue Book":

Finger tip index pops open 190 pages of vital information any time you need it. From industry's Blue Book of Wire Rope you'll get at your finger tips—What is 6x19 Classification? Why and How Lang Lay is different from Regular Lay. What is "Peoning", "Rated Capacity", "Metallic Core", "Cable-Laid Rope"? You'll have such vital information as "Inspection", "Correct Spooling", "Constructions", "Sheave Maintenance", "Multiple-Rope Reavings", "Swaged Fittings," use and abuse of wire rope, etc. Macwhite Wire Rope Company, Kenosha, Wisconsin.

For more details circle No. 411 on enclosed return postal card.

Truscale Remote Reading Liquid Level Gages:

New 8-page, 3-color Catalog No. 338 covers in detail the complete line of Jerguson Truscale Gages including Standard, Red Flasher and Inclined Styles. These gages are for remote liquid level indication for boilers, deaerating vessels, boiler feed water tanks, storage tanks, etc. Information on the various styles, models and datum column simplifies selection of the Truscale best suited for any specific requirement. Features operation and application data, and accessories are explained in detail. Jerguson Cage and Valve Co., Adams Street, Burlington, Mass.

For more details circle No. 412 on enclosed return postal card.

Safety Clamp for Linemen:

Brochure introduces a new safety clamp for linemen. Unit can stand loads up to 2,100 pounds. Complete assembly includes the safety clamp, cable latch, belt snap, belt, cable, brackets and clamps. Meyer Machine, Inc., Red Wing, Minnesota.

For more details circle No. 413 on enclosed return postal card.

Automotive Lighting and Safety:

A complete line of automotive lighting and safety equipment is described in a new 3-color product manual. Turn signals, mirrors, stop lights, clearance and marker lights, flare kits and extinguishers, etc. for buses, trucks cars and tractors are illustrated. R. E. Dietz Company, 114 Leavenworth Ave., Syracuse, N Y.

For more details circle No. 414 on enclosed return postal card.

Kick-Press Safety Guard:

Data Sheet depicts new guards for an air-driven press and a drill press. Unit features a plastic shield, lock and inspicuous guard wire. A finger or any other obstruction instantly locks the ram to prevent completion of the stroke. Seargeant Metal Products Inc., No. 10 Pittsford Rd., Mendon, N. Y.

For more details circle No. 415 on enclosed return postal card.

Safety Guard for Punch Presses:

A brochure and instructional manual describes a press guard that protects operators against their own careless motions as well as mechanical failure or repeats, etc. of the press. Press will not operate unless the failure or guard shield is in place keeping hands out of the danger zone during press operations. The Luther Manufacturing Co. Inc., Olean, N. Y.

For more details circle No. 416 on enclosed return postal card.

Guide Pin Covers:

The booklet illustrates how guide pin covers close the gaps between pins and bushing to protect guides from accidental nicks, etc. and prevent injury to operators. Units can be used on shop equipment and as a protective covering for finished products such as trucks, watches and electronic computors. Central Safety Equipment Co., 6611 Marsden St., Philadelphia, Pa.

For more details circle No. 417 on enclosed return postal card.

Bandaging Procedures:

16-page booklet briefly outlines bandaging procedures. Diagrams help explain the advantages that accrue in using sterile, self-adhering bandages. Sections are devoted to use in orthopedics, surgery, and pediatry. Suitable for use as a reference work and for classroom instruction. General Bandages, Inc., 6300 Lehigh Ave., Morton Grove, Ill.

For more details circles No. 418 on enclosed return postal card.

Steering Aid for Industrial Trucks:

Data Sheets illustrate the many safety features incorporated in this new steering aid. Unit prevents shock to driver when vehicles hit obstacles, reduces operator fatigue and provides for a smoother ride. Specifications and prices are included. Kosch Mfg. Co., Columbus, Nebr.

For more details circle No. 419 on enclosed return postal card.

Changeable Letter Signs:

Handbook details effective methods for the most profitable use of copy boards. Chapters deal with the storage of letters, writing copy, spacking and display, and illumination techniques. Hundreds of useful slogans round out the booklet and provide a valuable reference. Wagner Sign Service, Inc., 216 Hoyne Ave., Chicago 12, Ill.

For more details circle No. 420 on enclosed return postal card.

Improved Vision Plan:

Attractively designed booklet presents convincing statistics to illustrate the need for a systematic vision program throughout industry. This manufacturer's plan to improve eye-sight and thereby upgrade production is outlined in detail. Endorsements from leading companies across the nation attest to its efficiency. American Optical Company, Southbridge, Mass.

For more details circle No. 421 on enclosed return postal card.

Acid Resistant Apparel:

Well illustrated catalog displays acid-resistant work clothes in Dacron, Orlon, Dynel and wear blends. Includes tests and chart demonstrating the superior quality and economy of this apparel. Enclosed with the catalog is a swatch folder with actual swatches established for testing. Worklon Inc., 253 W. 20th St., New York, N. Y.

For more details circle No. 422 on enclosed return postal card.

Fire Alarm System Regulations:

Specifications for local manual and automatic fire alarm systems are listed in this informative sheet. The regulations for installation, operation and maintenance are included in this informative sheet. The regulations for installation, operation and maintenance are all included in the circular. Notofier Corporation, 239 South 11th St., Lincoln 8, Nebr.

For more details circle No. 423 on enclosed return postal card.

Dry Chemical Extinguisher:

A pressurized dry chemical fire extinguisher is displayed in this attractive pamphlet. Included are many illustrations pointing out its advantages and wide variety of uses. The pamphlet also shows the convenient sizes in which it is manufactured. Leeder Manufacturing Co., Briarcliff, N. Y.

For more details circle No. 424 on enclosed return postal card.

Electronic Starter for Floor Machines:

Bulletin dissects the parts of a gear head motor for detailed study. Each section is clearly illustrated, and includes an explanation of its function and special features. A ball bearing gear unit is also described and pictured. Multi-Clean Products, Inc., 2277 Ford Parkway, St. Paul 1, Minn.

For more details circle No. 425 on enclosed return postal card.

"Built-in" Protection Found in New Coating:

An attractively designed brochure and accompanying bulletin introduces a new protective rubber coating. Its many uses in the home and industry, and its new formula are spotlighted. Application instructions and illustration complete the report. Charleston Rubber Co., 16 Stark Industrial Park, Charleston, S. C.

For more details circle No. 426 on enclosed return postal card.

Circle Item No. 78—Reader Service Card

STOP ACCIDENTS *with the* **MARK III**

60 BRILLIANT RED FLASHES A MINUTE

Designed for:

- Dangerous Entrances and Exits
- Hazardous Locations • Traveling Cranes
- Moving Machinery • Disaster Warnings

No one can miss this signal! Covers 360° like an airfield beacon . . . with a powerful red flash every second! Heavily constructed. Beautifully finished in vitreous enamel to last indefinitely . . . corrosion proof! TROUBLE FREE synchronous motor 115/130 V., A.C. Standard 75 W. Bulb easily replaceable. Maintenance and upkeep negligible.

WRITE TODAY! Get the Facts

TRIPPE MFG. CO., Dept. E-2
133 N. Jefferson St., Chicago 6, Ill.

THE POSITIVE LADDER SAFETY DEVICE

LOCKS-IN-A-NOTCH!

CLIMBING MADE SAFE!

If climber starts to fall, device locks in a notch automatically, instantly. Holds securely. Limits fall to 6 inches.

PREVENTS DEATH AND INJURIES — *FROM FALLING*

AUTOMATIC, POSITIVE. Will instantly catch and hold workman if he starts to fall, **even if unconscious.** Requires no attention from climber; he climbs in normal manner. Inexpensive. Easy to install; 3 men can clamp it to ordinary ladder in few hours. Clamps to any rung ladder, peg ladder, pole or framework. No welding or cutting. Notched rail hot-dipped galvanized. Entire equipment rust and corrosion proof. Can be kept free of ice by applying heat inside the carrier rail. In use approx. 10 years. Approved by Safety Engineers and Govt. Agencies throughout country. Patented. Manufactured only by

SAFETY TOWER LADDER CO.
1024 Burbank Blvd., P.O. Box 1052
BURBANK, CALIFORNIA

Circle Item No. 79—Reader Service Card

Index to Advertisers

A comprehensive Classified Safety Product Index and a Directory of Safety Equipment Sources appear in the March, 1958 Issue.

When writing them, please mention NATIONAL SAFETY NEWS

A

Alan Wood Steel Co. 5
Aluminum Ladder Co. 111
American Abrasive Metals Inc. 105
American Biltrite Rubber Co. 11
American Chain & Cable Co., Inc. 49
American Optical Co. ..... B.C.
American Tel. & Tel. Co. 89
Ampco Metal, Inc. 62
Ansul Chemical Co. 47
Arabian American Oil Co. 106

B

Bausch & Lomb Optical Co. 51
Blonder-Tongue Laboratories Inc. 90
Brossard, Lester L., Co. 101
Bullard, E.D., Co. 64

C

Calumet Steel Castings Corp. 127
Chicago Eye Shield Co. ..... I.B.C.
Columbus McKinnon Chain Corp. 50
Coppus Engineering Co. 9
Crouse-Hinds Co. 91

D

Detex Watchclock Corp. 56
DuPont, E. I., De Nemour & Co. 16-63

E

Economy Engineering Co. 102
Edmont Mfg. Co. 52
Ellwood Safety Appliance Co. 108
Employers Mutual of Wausau 59
Ericson Mfg. Co. 107

F

Federal Sign & Signal Corp. 57
Fendall Co. 53
Fibre Metal Products Co. 90
Finnell Systems, Inc. 118

G

Getz-A-Lite Co. 127
Globe Co. 112
Gro-Cord Rubber Co. 94

H

Hillyard Chemical Co. 45
Holt Mfg. Co. 109
Horizon Industries 104
Huntington Laboratories Inc. 106
Hy-Test Div., International Shoe Co. 1

I

Industrial Products Co. 112
Iron Age Div., H. Childs & Co. 43

J

Jackson Products Div., Air Reduction Sales Co. 107
Johnson & Johnson 113
Junkin Safety Appliance Co. 104

K

Kennedy-Ingalls Co. 103
Kidde, Walter, & Co. 95

L

Legge, Walter G., Co., Inc. 102
Lehigh Safety Shoe Co. 3
Littell, F. J., Machine Co. 113

M

Macwhyte Co. 15
McAn, Thom, Safety Shoe Div. 61
McDonald, B. F., Co. 114
Merrill Brothers 110
Mine Safety Appliance Co. 86-87-110
Minnesota Mining & Mfg. Co. 93

N

National Disinfectant Co. 115
National Safety Council 97-98-99-100

O

Onox, Inc. 111

P

Portable Light Co., Inc. 107
Practical Mfg. Co. 105
Prairie State Products Co. 108

Q

Queens Optical Co. 114

R

Randolph Laboratories Inc. 116
Riegel Textile Corp. 46
Riggs Nucleonics Corp. 10
Rose Mfg. Co. 116

S

Safety Box Toe Co. ..... I.F.C.
Safety Tower Ladder Co. 130
Scott Aviation Corp. 6
Sigma Engineering Co. 130
Silicone Paper Co. of America Inc. 13
Speakman, The Company 48
Standard Safety Equipment Co. 60
Stonehouse Signs, Inc. 55
Surety Rubber Co. 101
Surgical Mechanical Research, Inc. 109

T

Taylor, S. G., Chain Co. 115
Teet, Inc. 58
Trippe Mfg. Co. 130

U

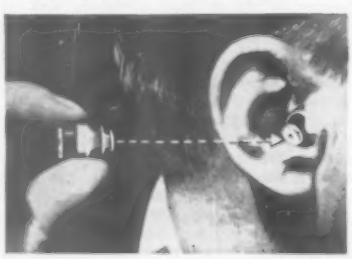
U-C Lite Mfg. Co. 127
U. S. Borax & Chemical Corp. Pacific Coast Co., Div. 54

W

Watchmoket Optical Co. 117
Welsh Mfg. Co. 92
West Chemical Products, Inc. 41
Wheeler Protective Apparel Inc. 117
Wiesman Mfg. Co. 127
Wilkins Co., Inc. 44
Williams Jewelry & Mfg. Co. 103
Willson Products Div., Ray-O-Vac 7

***Lee Sonic* EAR-VALVS**

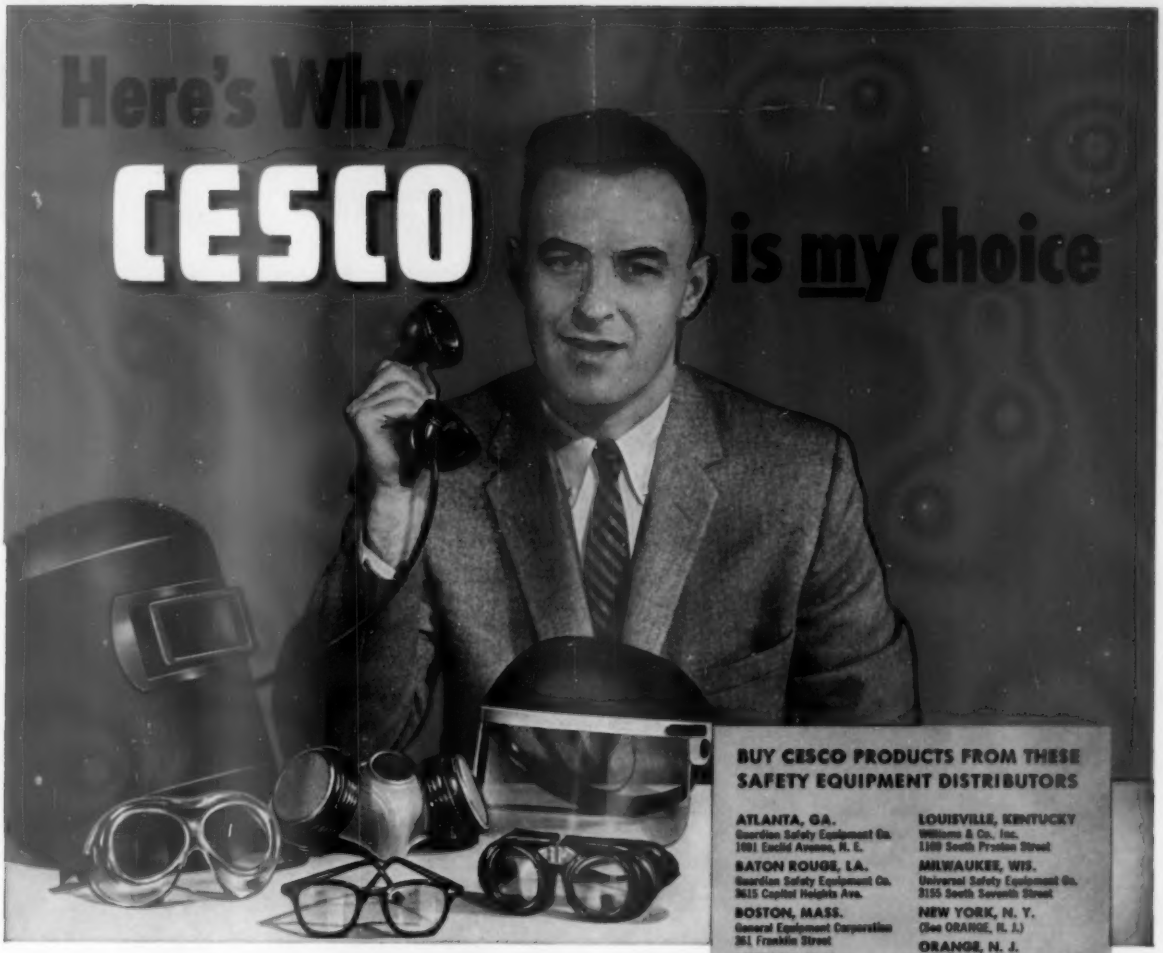
Eliminate the HARMFUL Effects of NOISE to The EAR DRUMS . . .



A FREE 30 Second Demonstration will PROVE this BEYOND QUESTION We GUARANTEE THAT! Remember they are NOT EAR PLUGS! They are scientifically developed sound controls that protect the ear drums without interfering with normal conversation or sound. We'll gladly send you a pair for actual demonstration. THEN you will find out why they are recommended and used wherever NOISE is a HAZARD and a deterrent to normal production. Send for your demonstration pair TODAY on company letterhead. No obligation to purchase.

SIGMA ENGINEERING COMPANY
1491 Vine St., Dept. F-3, Los Angeles 28, Calif.

Circle Item No. 80—Reader Service Card



There's a CESCO Representative Nearby Ready to Give Me Fast Action On Any Safety Equipment Need

As a safety engineer, I expect two things from my safety equipment source—a complete line of all types of safety equipment and prompt delivery of my order. For years, CESCO has more than met these requirements on both counts. Their distributors are truly safety specialists in every sense of the word, who offer a well-engineered, top quality line of safety glasses, goggles, face shields, welding helmets, respirators, hoods—in fact all of my many safety equipment needs. Equally important, their distributors are located from coast to coast, ready to give expert safety equipment advice. Then, they back up their recommendations with fast delivery of my order. In most cases, I've found the CESCO distributor is able to fill my order from his own stock.

Make a note of the CESCO distributor nearest you and call him next time you have a safety equipment problem

BUY CESCO PRODUCTS FROM THESE SAFETY EQUIPMENT DISTRIBUTORS

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Guardian Safety Equipment Co.
1691 Euclid Avenue, N. E.

BATON ROUGE, LA.
Guardian Safety Equipment Co.
3615 Capitol Heights Ave.

BOSTON, MASS.
General Equipment Corporation
261 Franklin Street

BUFFALO, N. Y.
The Watson Company
1362 Kenmore Avenue

CHICAGO, ILL.
Universal Safety Equipment Co.
5115 West Diversey Avenue

CINCINNATI, OHIO
Williams & Co., Inc.
3231 Fredonia Avenue

CLEARWATER, FLORIDA
Car-Mad Equipment Company
608 Palm Avenue, Belleair

CLEVELAND, OHIO
Williams & Co., Inc.
3700 Perkins Avenue

COLUMBUS, OHIO
Williams & Co., Inc.
900 Williams Avenue

DALLAS, TEXAS
Guardian Safety Equipment Co.
3670 Flatley Drive

DENVER, COLO.
Goodall Rubber Co.
133 Santa Fe Drive

DETROIT, MICH.
Averill Equipment Company
19225 Consent Avenue

HOUSTON, TEXAS
Guardian Safety Equipment Co.
300 Sandman Street

KANSAS CITY, MO.
Safety, Incorporated
17½ East 31st Street

KNOXVILLE, TENN.
Safety Equipment Distributing Co.
632 West Main Avenue

LOS ANGELES, CALIF.
Guardian Safety Equipment Co.
7223 South Main Street

LOUISVILLE, KENTUCKY
Williams & Co., Inc.
1100 South Preston Street

MILWAUKEE, WIS.
Universal Safety Equipment Co.
3155 South Seventh Street

NEW YORK, N. Y.
(See ORANGE, N. J.)

ORANGE, N. J.
Guardian Safety Equipment Co.
400 South Jefferson Street
(New York-New Jersey Area)

PEORIA, ILL.
Standard Industrial Products Co.
920 North Garfield Avenue

PHILADELPHIA, PA.
Guardian Safety Equipment Co.
214 South 45th Street

PITTSBURGH, PA.
Williams & Co., Inc.
901 Pennsylvania Avenue

ST. LOUIS, MO.
Safety, Incorporated
2008 Olive Street

ST. PAUL, MINN.
Continental Safety Equipment, Inc.
1851 Selby Avenue

SALT LAKE CITY, UTAH
Universal Safety & Fire Equipment Co., 727 South West Temple

SAN MATEO, CALIF.
Guardian Safety Equipment Co.
220 East Third Avenue

SPOKANE, WASH.
Spokane Safety Appliance Co.
N. 219 Division Street

TOLEDO, OHIO
Williams & Co., Inc.
946 Kane Street

TULSA, OKLA.
Guardian Safety Equipment Co.
1742 South Main Street

MEXICO CITY, D. F.
Safety Equipment, S. A.
Sullivan No. 95

MONTREAL, CANADA
The Butler Optical Company, Ltd.
1420 Mountain Street

CESCO

CESCO FOR SAFETY

CHICAGO EYE SHIELD COMPANY
2705 West Roscoe Street, Chicago 18, Illinois

Circle Item No. IBC—Reader Service Card

You Asked for Them...HERE THEY ARE

AO ULTRASCOPIC SAFETY GLASSES

*in Mahogany **in Pink Crystal

Here's eye flattering eye protection workers *want* to wear! The glasses have all the safety features of our onyx on crystal frame series including heavier eyewire and bridge — the patented eyewire specially engineered to support lens against deflection toward eye if struck — an exclusive AO feature. Perforations in side shields control fogging, shield contour makes it fitting easier and protects like a cup goggle. Give this handsome, comfortable eye protection to your workers. Your nearest AO Safety Products Representative can supply you.

Always Insist on AO Trademarked Safety Products

American Optical COMPANY
SAFETY PRODUCTS DIVISION

Quick Facts

44, 46, 48 eye sizes (42 without side shields)

18, 20, 22, 24, 26 bridge sizes

Comfort cable and spatula temples

Frames — flame-resistant cellulose acetate butyrate

Bridge — sturdy, face-formed

Nose Pads — wide for comfort — rocking pads also available

Lenses — symmetric, no rights or lefts. Planos interchangeable. 6 Curve Clear Super Armorplate or 6 Curve Calobar Super Armorplate. May be ground to worker's prescription.

AO Plaque — you can't miss it and you can't miss obtaining true safety frames when you see it.

SOUTHBRIDGE, MASS.
Safety Service Centers in Principal Cities

Circle Item No. 8C—Reader Service Card